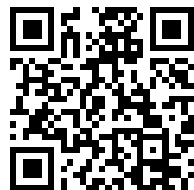

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CHINA SEA PILOT

VOL. III

**COMPRISING
THE COAST OF CHINA FROM FOKAI POINT
TO YALU CHIANG OR AMNOK KANG; THE
NORTHERN COAST OF LUZON; FORMOSA;
AND THE WESTERN COAST OF KOREA**

**SECOND EDITION
1954**

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ATTENTION
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INFORMATION
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OR SALE OF
LICATIONS.
O BRITISH

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SQUADRONS, CONVOYS, AND OTHER WARSHIPS
AT SEA, AND AIRCRAFT CARRIERS AT ANCHOR.

WARNING SIGNALS TO DENOTE THE PRESENCE
OF SUBMARINES.

WARNING SIGNAL TO DENOTE THE PRESENCE
OF A SUNKEN SUBMARINE.

NAVIGATIONAL AND GALE WARNINGS, ETC.,
BROADCAST BY RADIO IN GREAT BRITAIN AND
IRELAND.

MINESWEEPING OPERATIONS.

BRITISH ISLES.—LIST OF STORM SIGNAL
STATIONS.

SUBMARINE CABLES.

INFORMATION ABOUT NAVIGATIONAL WARN-
INGS.

AVAILABILITY AT COMMERCIAL PORTS OF
NOTICES TO MARINERS.

ADMIRALTY PUBLICATIONS.

Adoption of New Style Compass Rose on Admiralty Charts.

ADMIRALTY TIDE TABLES.

Addenda and Corrigenda.

REPORTS OF SHOALS OBTAINED BY ECHO
SOUNDING.

AREAS DANGEROUS DUE TO MINES ; SWEEPED
ROUTES.

THE INTERNATIONAL HYDROGRAPHIC BUREAU.

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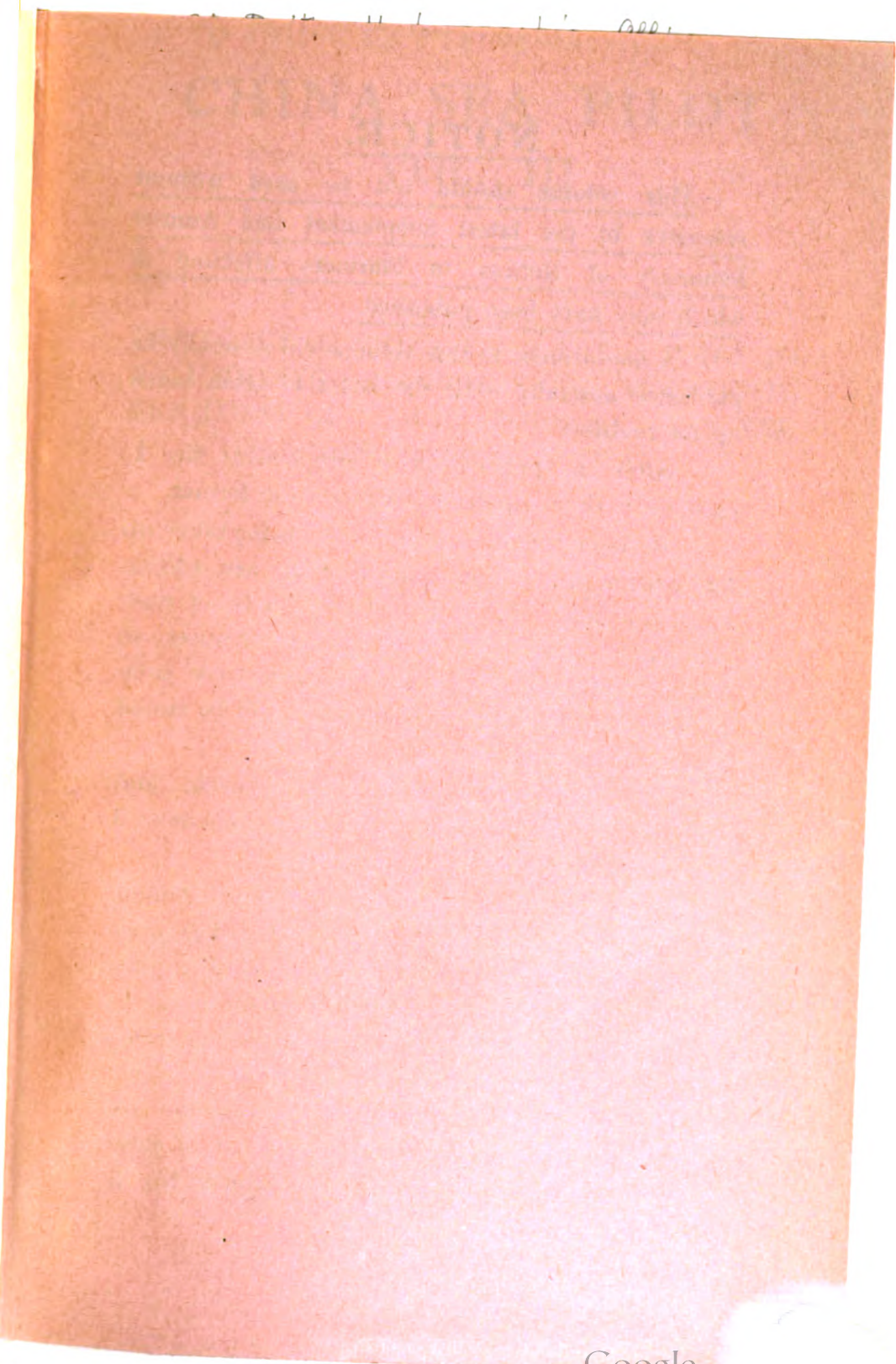
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Marine Offices in the United Kingdom. Copies may also be inspected at Dominion,
Indian and Colonial Government Shipping Offices and at British Consulates.*

NOTATIONS OF SUPPLEMENTS AND ANNUAL
SUMMARIES OF NOTICES TO MARINERS
RELATING TO THIS BOOK.

To be filled in by Navigating Officer.

(In Chart Depôts the first two columns are alone to be filled up.)

Title.	Date of Publication and Number.	Date of insertion of Note in Margins of Book.



NOTICE.

This volume should not be used without reference to the latest Supplement and Annual Summary of Notices to Mariners affecting it which may have been published.

A Supplement to this volume will generally be published annually until the latter is again taken up for revision.

After the publication of Supplement No. 1, each succeeding supplement cancels the former.

Between the time of the volume being taken up for revision and the publication of the new edition no supplement will be issued, but early in each year a Summary of the Admiralty Notices to Mariners affecting the volume, which have been published during the preceding year, will be issued as a separate publication.

The publication of all Supplements and Summaries of Notices to Mariners is announced in Admiralty Notices to Mariners.

The latest Supplement and any Annual Summary of Notices to Mariners that has been published affecting this volume will be obtainable gratuitously by purchasers of this volume from the Agents for the sale of Admiralty charts and other Hydrographic publications, on application either personally or by letter; in the latter case the cost of postage must be enclosed. For a list of these Agents see Admiralty Notice to Mariners No. 2, published annually.

St. Brit. Hydrographic Office.

CHINA SEA PILOT

VOL. III

COMPRISING
THE COAST OF CHINA FROM FOKAI POINT TO
YALU CHIANG OR AMNOK KANG; THE NORTH-
ERN COAST OF LUZON; FORMOSA; AND THE
WESTERN COAST OF KOREA

SECOND EDITION, 1954

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To face page ii.]

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CAUTION.

IN THIS WORK THE BEARINGS ARE REFERRED TO THE TRUE COMPASS, AND WHEN GIVEN IN DEGREES ARE RECKONED CLOCKWISE, FROM 000° (NORTH) TO 359°.

THE BEARINGS OF LIGHTS ARE GIVEN FROM SEAWARD.

THE LATITUDES AND LONGITUDES GIVEN IN THE TEXT ARE APPROXIMATE.

THE DISTANCES ARE EXPRESSED IN SEA-MILES OF 60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO THE TENTH PART OF A SEA-MILE. IT IS OFTEN ACCEPTED AS BEING ONE TENTH OF A NAUTICAL MILE.

THE DEPTHS ARE GIVEN BELOW CHART DATUM LEVEL WHERE NOT OTHERWISE STATED.

HEIGHTS ON THE LAND ARE GIVEN ABOVE MEAN LEVEL OF HIGH WATER SPRING TIDES.

FIGURES IN BRACKETS GIVEN AFTER THOSE DENOTING FEET, FATHOMS AND YARDS ARE THEIR EQUIVALENTS IN METRES.

TIME IS EXPRESSED IN THE FOUR-FIGURE NOTATION COMMENCING AT MIDNIGHT.

THE TERM "POWER VESSEL" USED HEREIN INCLUDES ANY VESSEL PROPELLED BY MACHINERY.

A NAME IN BRACKETS, IMMEDIATELY FOLLOWING ANOTHER NAME, IS THE OBSOLETE NAME WHICH IS STILL SHOWN ON THE ADMIRALTY CHARTS. AS A GENERAL RULE, THE BRACKETED NAME IS ONLY INSERTED IN THE DESCRIPTION OF THE PLACE OR OBJECT PREVIOUSLY BEARING THAT NAME.

WHEN SHADING IS USED TO INDICATE COLOURS OF FLAGS, TIDAL LIGHT SIGNALS, OR BEACONS, IT IS AS FOLLOWS :



Yellow.



Red.



Blue.



Green.



Black.

ADVERTISEMENT TO THE SECOND EDITION.

The China Sea Pilot, Volume III, contains a description of the coast of China from Fokai point, situated 40 miles north-eastward of Hong Kong, to Yalu chiang or Amnok kang; the northern coast of Luzon; Formosa; and the western coast of Korea.

This, the second edition of the China Sea Pilot, Volume III, has been prepared by Rear-Admiral A. L. Jackson, from publications issued by the Chinese, Japanese and United States Governments, and from the latest information received in the Hydrographic Department.

The Chinese names in this volume have, as far as possible, been rendered in accordance with the modified Wade-Giles system of transliteration. Other transliteration systems have had to be used for names in areas where the modified Wade-Giles "cover" was incomplete.

The meteorological and ocean currents information has been revised by the Meteorological Office of the Air Ministry. Temperature is expressed in degrees Fahrenheit, rainfall in inches, speed in knots, and distance in sea miles unless expressly stated otherwise. Information received from meteorological services which do not use these units has been converted into the units mentioned above by the Meteorological office.

Mariners and others are invited in the interests of navigation to forward to the Hydrographer, Admiralty, Osgate Lane, Cricklewood, London, N.W.2, any information that may come under their notice, which would be useful for the correction of the charts and other hydrographic publications issued by the British Admiralty; *early* advice as to newly-discovered dangers, the establishment of, or changes in, any aids to navigation, is specially requested.

Copies of a form (H. 102), on which to render information, can be obtained gratis from the Hydrographer of the Navy, Hydrographic Supplies Establishment, Creechbarrow House, Taunton, Somerset, or from any of the Admiralty Chart Agents in Great Britain and abroad, a list of whom is published, annually, in Admiralty Notice to Mariners No. 2.

By the publication of this volume, the first edition of China Sea Pilot, Vol. III, 1937, and Supplement No. 7, 1950, are cancelled, and all information affecting that work contained in Notices to Mariners, up to and including No. 1736 of 1954, has been embodied in this volume; for temporary and preliminary Notices to Mariners affecting this edition, the list of temporary and preliminary Notices to Mariners in force, published monthly in the weekly edition of the Admiralty Notices to Mariners, should be consulted.

A. DAY,
Vice-Admiral,
Hydrographer of the Navy.

*Hydrographic Department,
Admiralty, London,
31st July, 1954.*

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GLOSSARIES

CHINESE—ENGLISH

(The Chinese words in this glossary have other meanings in addition to those given).

Chinese	English	Chinese	English
An . . .	Embankment, bank, shore, coast, cliff	Chung . . .	Middle, centre
An-chiao . . .	Submerged rocks, reef	Ch'ün-tao . . .	Archipelago, group of islands
Ao . . .	Bay, cove, inlet, dock	Chu-tao . . .	Archipelago, group of islands
Cha . . .	Lock, dam, flood barrier	Erh . . .	Two
Chau . . .	See Chou	Feng . . .	Mountain, peak
Chao . . .	Bog, marsh	Fou . . .	Port
Chen . . .	Town, market town	Fu . . .	Province capital
Ch'eng . . .	City, walled town	Hai . . .	Sea, gulf
Chi . . .	Obstruction, ledges in a river	Hai-ching . . .	Strait, channel
Ch'i . . .	Stream, river, head, cape, point, moun- tain, seven	Hai-hsia . . .	Strait, channel
Chia . . .	Cape, bluff	Hai-k'ou . . .	Channel entrance
Ch'ia . . .	Customs barrier	Hai-pin . . .	Seashore, beach
Chiang . . .	River, shoal, har- bour, port, inlet, channel, sound	Hai-wan . . .	Bay, gulf
Chiang-tao . . .	Channel, strait, sound	Hang-lu . . .	Fairway
Chiao . . .	Creek, rock, reef, shoal, islet, cape, point	Hang-men . . .	Pass navigable to ships
Ch'iao . . .	Bridge	Hei . . .	Black
Chien . . .	Mountain, peak	Ho . . .	River, waterway
Ch'ien . . .	Shallow, shoal	Hsi . . .	West, mountain, stream
Ch'ien-lai . . .	Bank, shoal	Hsia . . .	Strait, gorge, lower
Ch'ien-t'an . . .	Bank, shoal	Hsiang . . .	Rural area, village
Ch'ien-tui . . .	Bank	Hsiao . . .	Small
Ch'ih . . .	Pond	Hsien . . .	District, district capital
Chih-chiang-tao . . .	Reach	Hsin . . .	New
Ching . . .	Capital city, isth- mus, ford, ferry	Hsü . . .	Island
Chiu . . .	Nine	Hsuan . . .	Eddies
Cho . . .	See Chou	Hu . . .	Lake
Chou . . .	Island, bank	Huang . . .	Yellow
Chow . . .	See Chou	Hung . . .	Red
Ch'uan . . .	Stream, river	Kan . . .	Dry, harbour, port
Chuang . . .	Village	Kan . . .	See Chiang
Chüeh . . .	Cape, point	Kang . . .	Mound, hill
		Kao . . .	High
		Kao-chiao . . .	Promontory
		Kao-yüan . . .	Plateau
		Kau . . .	See K'ou
		Kiang . . .	See Chiang

Chinese	English	Chinese	English
Kiao . . .	<i>See</i> Chiao	San . . .	<i>See</i> Shan
Kou . . .	Ravine, gully, ditch	San-chiao-chou . .	Delta
K'ou . . .	River entrance, port, mouth, inlet	Seu . . .	<i>See</i> Hsü
Kow . . .	<i>See</i> K'ou	Sha . . .	Sand, sandbank, sand cay, low sandy point
Ku . . .	Valley	Sha-chiao . . .	Sandspit
Ku-k'ou . . .	Ravine	Sha-ch'iu . . .	Sand dune
Kuan . . .	Barrier, customs	Shan . . .	Mountain, hill, is- land
Kuo . . .	Country, king- dom	Shang . . .	Upper
Lai . . .	Submerged rock, shoal	Shan-hu . . .	Coral
Lan . . .	Blue	Shan-hu-chiao . .	Coral reef
Lao . . .	Old	Shan-mo . . .	Mountain range
Li . . .	Gravel, shingle, inner	Shan-sha . . .	Bar, sand bar
Lieh-tao . . .	Group of islands, islands	Shan-tien . . .	Mountain summit
Lieh-yen . . .	Group of rocks	Shao . . .	Small, few
Lin . . .	Forest	Sha-t'an . . .	Sandy shoal, sand flats
Ling . . .	Mountain, moun- tain range	Sha-tsui . . .	Sandspit
Liu . . .	Stream, current, six	Sha-tui . . .	Sandbank
Lu . . .	Road	Shen . . .	Deep
Man . . .	<i>See</i> Men	Sheng . . .	Province
Mao-ti . . .	Anchorage	Shih . . .	City, market, stone, rock, hill, ten
Men . . .	Gate, pass, channel, strait	Shih-t'ai . . .	Ridge of rocks
Miao . . .	Temple	Shih-ti . . .	Swamp
Mu . . .	Trees, wood, grave	Shu . . .	Tree
Mun . . .	<i>See</i> Men	Shu-lin . . .	Forest
Nan . . .	South	Shui . . .	Water, river
Nei . . .	Inner	Shui-kuan . . .	Customs
Nei-ao . . .	Basin	Shui-lu . . .	Channel, passage
N'i . . .	Mud	Shui-tao . . .	Channel, passage
O . . .	<i>See</i> Ao	Ssu . . .	Monastery, temple, four
Ou . . .	<i>See</i> Ao	Su . . .	<i>See</i> Hsü
Pa . . .	Embankment, quay, eight	Ta . . .	Great, large
Pai . . .	White	T'a . . .	Pagoda
Pang . . .	<i>See</i> Peng	Tai . . .	<i>See</i> Tui
Pan-tao . . .	Peninsula	T'an . . .	Bank, flats, rapids, lake
Pao . . .	Town, village, rampart	T'ang . . .	Embankment, pond
P'ao-t'ai . . .	Fort	Tao . . .	Island, road, paddy field
Pei . . .	North	T'ao . . .	Bay
Peng . . .	Creek	Tao-tzu . . .	Islet
Pi . . .	Cape, nose	Tau . . .	<i>See</i> Tao
Piao . . .	Rock, islet	Tautze . . .	<i>See</i> T'o-tzu
P'ing-chou . . .	Level shoals	Ti . . .	Embankment, dyke, earth, ground, place, low, bottom
P'o . . .	Arm of the sea	T'ien . . .	Arable land, field
Po-ti . . .	Roadstead, anchorage	Ting . . .	Summit, moun- tain
P'u . . .	Inlet, creek, vill- age, town, ram- part	T'o . . .	Stone, rocky eminence
San . . .	Three	T'o-tzu . . .	Stone, rocky knob, islet
		T'ou or Tou . . .	Cape, headland, point

Chinese	English	Chinese	English
T'ou-tzu . . .	Cape, headland, point	Wei . . .	Headland, tail, walled town
Tow . . .	See T'ou	Yai . . .	Cliff
Tsui . . .	Cape, point, spit	Yang . . .	Enclosed portion of the sea, channel
Tsui-tzu . . .	Cape, point, spit	Yeh . . .	Moorland
Tsui-wei . . .	Cape, point, spit	Yen . . .	Embankment, dyke, rock, reef, cliff
Ts'un . . .	Village	Yen-t'an . . .	Salt pan
Tu . . .	Ferry, ford	Yen-tien . . .	Salt pan
Tui . . .	Mound, bank	Yen-ch'ang . . .	Salt works
Tui-tsui . . .	Bank, spit	Yü . . .	Island
Tung . . .	East	Yün-ho . . .	Canal
Wa . . .	Swamp		
Wai . . .	Outer		
Wan . . .	Bay, gulf, bend in river		

JAPANESE—ENGLISH

Japanese	English	Japanese	English
Asase . . .	Ledge, shoal	Kaiho . . .	Fort
Bakufu . . .	Waterfall	Kaikyō . . .	Strait
Bana . . .	See Hana	Kaiwan . . .	Gulf
Bi . . .	Cape	Kaku . . .	Point
Byōchi . . .	Anchorage	Kan . . .	Point, cape
Da . . .	Islet	Kawa . . .	River
Dake . . .	See Take	Kei . . .	River
Dashi . . .	Shoal, rock, islet	Ki . . .	Point, cape
Gaikō . . .	Outer harbour	Kita . . .	North
Gan . . .	Rock	Ko . . .	Lake, lagoon, inlet
Ganpeki . . .	Quay	Kō . . .	Harbour, port, point, cape
Gata . . .	Lagoon	Kuchi . . .	Mouth of channel
Gawa . . .	See Kawa	Kuri . . .	See Guri
Genya . . .	Marsh	Machi . . .	Town
Guchi . . .	Mouth of channel	Matsu . . .	Cape, point
Guntō . . .	Archipelago	Minami . . .	South
Guri . . .	Reef, rock	Minato . . .	Harbour, port
Gyokō . . .	Fishing harbour	Minatomachi . . .	Port
Hakuchi . . .	Roadstead	Mine . . .	Peak
Hama . . .	Beach, coast	Misaki . . .	Cape, point
Hana . . .	Cape, point	Mori . . .	Forest, wood
Hantō . . .	Peninsula	Mura . . .	Village
Hatoba . . .	Wharf	Nada . . .	Sea, stretch of water
Heigen . . .	Plain	Naikō . . .	Inner harbour
Higashi . . .	East	Ne . . .	Rock
Ho . . .	Bay	Nishi . . .	West
Hō . . .	Peak	Nopori . . .	Mountain
Ishi . . .	Rock above water	Numa . . .	Marsh, swamp
Iwa . . .	Rock	Nupuri . . .	Mountain
Jima . . .	See Shima	Ō . . .	Cove
Ka . . .	River	Oka . . .	Land, mound, hill
Kai . . .	Sea, gulf	Oki . . .	Bay
		Pii . . .	Cape

Japanese	English	Japanese	English
Ressho . . .	Chain of islets	Sone . . .	Rock, shoal
Retsugan . . .	Chain of rocks	Su . . .	Bank
Rettō . . .	Chain of islands	Sui . . .	Cape, point
Saki . . .	Cape, point	Suidō . . .	Channel
San . . .	Mount, mountain	Syotō . . .	See Shotō
Satai . . .	Sandbank	Tā . . .	Headland
Sawa . . .	Marsh, swamp	Tai . . .	Bank
Se . . .	Bank, islet, reef, shoal	Taikei . . .	River
Sei . . .	West	Take . . .	Hill, mountain
Seki . . .	Cape, point, rock	Taki . . .	Waterfall
Sekitai . . .	Ridge of rocks	Tan . . .	Cape, point
Sen . . .	Peak, river, stream	Tō . . .	Island, islet, bay, point, cape
Sendan . . .	Bank	Torii . . .	Gateway of Shinto temple
Sentai . . .	Shoal bank	Unwa . . .	Canal
Sha . . .	Sandbank	Ura . . .	Cove
Shi . . .	Point, cape, city	Wan . . .	Bay
Shima . . .	Island	Yama . . .	Mountain
Shio . . .	Current, tide	Zaki . . .	See Saki
Sho . . .	Island	Zan . . .	See Sen
Shō . . .	Bank, shoal, reef	Ze . . .	Cape, point
Shotō . . .	Archipelago	Zen . . .	Mountain
Shū . . .	Bank		
Sima . . .	See Shima		
Soan . . .	Mountain		

KOREAN—ENGLISH

(Many of the Korean words in this glossary have other meanings in addition to those given).

Korean	English	Korean	English
Ak . . .	Mountain	Dae . . .	Mountain, hill
Am . . .	Rock	Dan . . .	Cape, point
Amsok . . .	Rock	Dang . . .	Temple
An . . .	Cliff, shore, bank	Do . . .	Island, islands, province
Ap . . .	Cape	Dong . . .	Village, settlement
Bando . . .	Peninsula	Du . . .	Point, cape
Bi . . .	Cape	Gak . . .	Point, cape
Bong . . .	Mountain peak	Gang . . .	River
Bu . . .	City, municipality	Gap . . .	Point, cape
Ch'am . . .	Village	Gi . . .	Point, cape
Chedo . . .	Island group	Got . . .	Point, cape
Chihyōp . . .	Isthmus	Gu . . .	Entrance, approach
Chijindu . . .	Headland	Gun . . .	County
Chin . . .	Ferry, fort	Gyo . . .	Bridge
Ch'o . . .	Islet, reef, bank	Ha . . .	River
Ch'oe . . .	Narrow cape	Hae . . .	Gulf, sea
Ch'olloe . . .	Shoals, shallows	Haegak . . .	Headland
Ch'ōn . . .	River, stream, village	Haegu . . .	Estuary
Chong . . .	Town, sandy spit	Haehyop . . .	Strait
Ch'ōntan . . .	Shoal	Hagu . . .	Estuary
Ch'ōnt'oe . . .	Shoal bank	Hang . . .	Harbour, point, cape
Chu . . .	Sandbar, shallows		
Ch'wi . . .	Point		

Korean	English	Korean	English
Hyōon . . .	Mountain, pass	P'onae . . .	Inlet
Jin	<i>See</i> Chin	Pong	<i>See</i> Bong
Ju	<i>See</i> Chu	Pu	<i>See</i> Bu
Kak	<i>See</i> Gak	Pudo	Quay, pier
Kang	<i>See</i> Gang	Puk	North
Kap	<i>See</i> Gap	Pukto	North province
Ki	<i>See</i> Gi	-ri	<i>See</i> -li
Kot	<i>See</i> Got	Roe	<i>See</i> Noe
Ku	<i>See</i> Gu	Ryōng	<i>See</i> Lyōng
Kun	<i>See</i> Gun	Sa	Marsh, flat, temple
Kundo	Archipelago, islet	Saju	Sandbar
Kūnhae	Coastal waters	San	Mountain, hill
Kyo	<i>See</i> Gyo	Satae	Heaped-up sand- bank
-li	Village	Sō	Island, rock, west
Lyōng	Mountain, pass	Sudo	Strait
Mal	Point, cape	Tae	<i>See</i> Dae
Man	Bay	Tan	<i>See</i> Dan
Mi	Spit, tail	T'an	Shoal, rock
Myoji	Anchorage	Tang	<i>See</i> Dang
Myon	Township	To	<i>See</i> Do
Naehang . . .	Inner harbour	T'oe	Heaped-up bank
Nam	South	T'oi	Heaped-up bank
Namdo	South province	Tong	<i>See</i> Dong
-ni	<i>See</i> -li	Tu	<i>See</i> Du
Noe	Reef	Tungdae . . .	Lighthouse
Nyōng	<i>See</i> Lyōng	Ye	Rock
Pakchi	Anchorage	Yō	Rock
Pando	<i>See</i> Bando	Yok	Town
Pi	<i>See</i> Bi	Yōlto	Island chain
P'o	Harbour, cape		

SYSTEM OF ORTHOGRAPHY

The following rules for the spelling of geographical names (termed P.C.G.N. Principles) have been adopted for British official use, and the names in Admiralty Hydrographic publications will be rendered in accordance with these rules as opportunity occurs.

In new editions of the various volumes of sailing directions names are, generally speaking, given in accordance with these rules, but where the name on the chart shows an older rendering of a name, such chart name is given in brackets after the new rendering and will also be given in the Index.

The rules for spelling in the P.C.G.N. Principles are as follows :—

- (1) The spelling of the names of (a) regions and geographical features of continental or inter-national extension, (b) water-areas extending beyond the territorial limits of recognized government, and (c) countries, shall be in accordance with English conventional usage ; *e.g.*, (a) Sahara, Alps, Danube, (b) Bay of Biscay, (c) Italy.
- (2) In the case of oceanographical features lying outside territorial waters, the descriptive terms entering into their names shall be in English ; *e.g.*, Challenger Bank, Dogger Bank, Walfisch Ridge (*not* Walfisch Rücken).
- (3) The approved name of any administrative division of a state,* or federation of states, or of any natural or artificial geographical feature or of any place lying wholly within one state, or federation of states, shall be that adopted by the supreme administering authority concerned with that state or federation of states ; *e.g.*, Uttar Pradesh (*not* United Provinces), Kaliningrad (*not* Königsberg) :
but, should a different name be current in English conventional usage, the latter may be given subordinate recognition ; *e.g.*, Cabo de Hornos (Cape Horn), Dhiórix Korínthou (Corinth Canal), Moskva (Moscow).
- (4) Where any name of the kinds referred to in Section (3) above contains a descriptive term in a foreign language that term shall not be translated into English ; *e.g.*, Cabo de Hornos (*not* Cape de Hornos), Schloss Bellinghoven (*not* Bellinghoven Castle), Isola d'Ischia (*not* Island of Ischia) :

but, where a geographical term on a foreign map or chart stands

*For the purpose of applying these Principles, the term "state" shall be taken to include an independent country, or colonial territory, or protectorate, protected state, or trust territory.

in isolation and is neither a geographical proper name nor is attached to such a name, it may be translated ; *e.g.*, " bridge " (*not* German " Brücke "), " ford " (*not* Russian " brod ").

- (5) The names of places and of geographical features in countries which officially use varieties of the Roman alphabet shall be accepted in their official spelling, including the accents and diacritical marks used in the respective alphabets.
- (6) The non-Roman letters in the official names of places and geographical features in countries which use partly-Roman alphabets may be transliterated into Roman letters in accordance with the conventions of the respective partly-Roman alphabets.
- (7) In countries where the official alphabet of the administering authority is not Roman :
 - (a) where an official Romanization acceptable to the Committee* is in current use the spelling of names shall be in accordance with it.
 - (b) where no official national Romanization exists but a system of Roman transliteration has been accepted by the Committee* for the country under consideration, the official forms of names shall be transliterated in accordance with it.
 - (c) where there is no system of Romanization, or none acceptable to the Committee,* the official forms of names shall be transliterated into the conventional alphabet given below.
- (8) In countries where the official script is not alphabetical the official forms of names shall be rendered in Roman letters in accordance with systems of transcription approved by the Committee,* *e.g.*,

China: the Wade-Giles system as modified in 1942
Japan: the Hepburn system as recommended in 1942
Korea: the McCune-Reischauer system.
- (9) In those territories where the foregoing Principles may prove to be inapplicable, geographical names should, whenever possible, be recorded in the alphabets officially used for the languages concerned, or be collected in the field by the scientific methods employed for the phonetic recording of speech. Only when these means fail should they be recorded in the conventional alphabet given below.

This system aims at giving a close approximation to the *local* pronunciation ; but it is recognized that in some languages, notably Russian, Greek, and Arabic, the necessity for letter-for-letter transliteration often renders this impossible.

*Permanent Committee on Geographical Names.

CONVENTIONAL ALPHABET

Symbol	Range of sound represented
<i>Vowels</i>	
a	<i>a</i> in <i>father</i> ; all the sounds represented by <i>a</i> in the French words <i>patte</i> , <i>pas</i> , <i>page</i> , <i>pâte</i> ; <i>o</i> in English <i>son</i> or <i>u</i> in <i>cut</i> ; also a shade of the unstressed neutral vowel (see under <i>ō</i> below).
e	the first part of the diphthong in <i>day</i> , <i>e</i> in French <i>thé</i> ; <i>ai</i> in <i>fair</i> , <i>è</i> in French <i>père</i> ; <i>e</i> in <i>bet</i> ; a shade of the unstressed neutral vowel (see under <i>ō</i> below).
i	<i>ee</i> in <i>fee</i> , <i>i</i> in French <i>si</i> ; <i>i</i> in Italian <i>via</i> ; <i>i</i> in <i>sit</i> .
o	<i>ou</i> in <i>bought</i> , <i>aw</i> in <i>law</i> , <i>o</i> in <i>not</i> ; <i>eau</i> in French <i>beau</i> , <i>o</i> in <i>rotund</i> .
ō	<i>ō</i> in German <i>schön</i> , <i>eu</i> in French <i>peu</i> ; <i>eu</i> in French <i>peur</i> , <i>œ</i> in French <i>œuf</i> ; <i>ea</i> in <i>earth</i> (the last is the stressed neutral vowel in English). The unstressed neutral vowel (the sound of <i>a</i> in <i>marine</i> , <i>e</i> in <i>often</i> , <i>u</i> in <i>difficult</i>) is better represented, according to its nearest approximation, by <i>a</i> or <i>e</i> .
u	<i>oo</i> in <i>boot</i> ; <i>oo</i> in <i>foot</i> or <i>u</i> in <i>put</i> (but not in <i>but</i>).
ū	<i>ū</i> in German <i>über</i> , <i>u</i> in French <i>lune</i> .
y	the cavernous vowel, unknown in standard English, represented by <i>yl</i> in Russian and by <i>i</i> in Turkish. Note that <i>y</i> is also used for a consonant-symbol (see below).

Diphthongs

Diphthongs may be represented by combinations of the vowel-symbols given above.

Consonants

b	English <i>b</i> , any other sound recognized as a kind of <i>b</i> by English ears, as <i>b</i> in Spanish <i>saber</i> .
ch or c* (= tsh)	<i>ch</i> in <i>church</i> . <i>c</i> is established with this value in parts of Africa. *See Instruction 6, below.
d	any sound recognized as a kind of <i>d</i> .
dh	the soft sound of English <i>th</i> in <i>this</i> , <i>they</i> , etc.
f	any kind of <i>f</i> .
g	<i>g</i> in <i>got</i> or <i>gift</i> .
gh	the soft guttural sound represented by <i>ġ</i> (<i>ghain</i>) in Arabic, which resembles that of Parisian <i>r</i> .
h	(i) the aspiration of vowels (the sounds preceding the vowels in <i>her hat</i>). (ii) the aspiration of consonants (emphatic <i>k</i> , <i>t</i> and <i>p</i> are aspirated in English ; <i>b</i> is often aspirated in Irish English). In a conventional alphabet it is possible to distinguish between the digraphs (pairs of letters standing for single sounds) <i>dh</i> , <i>gh</i> , <i>kh</i> , <i>sh</i> , <i>th</i> and <i>zh</i> , and aspirated <i>d</i> , <i>g</i> , <i>k</i> , <i>s</i> , <i>t</i> and <i>z</i> , respectively, only by means of elaborate devices.
j (= dzh)	in <i>jib</i> or <i>g</i> in <i>gem</i> .
k	any kind of <i>k</i> -sound, as <i>c</i> in <i>cat</i> .
kh	<i>ch</i> in Scottish <i>loch</i> or German <i>ach</i> .
l	<i>l</i> in <i>leave</i> ; <i>ll</i> in <i>wall</i> ; <i>ll</i> in Welsh <i>llan</i> .
m	English <i>m</i> .
n	English <i>n</i> .
ñ or ny	as in Spanish <i>cañón</i> . Established in many parts of Africa.
ng	<i>ng</i> in <i>singer</i> ; <i>ng</i> in <i>finger</i> .
p	any kind of <i>p</i> .
q	the guttural sound represented by <i>ق</i> (<i>qaf</i>) in Arabic.
r	<i>r</i> as sounded in Scotland ; any other clearly rolled or trilled <i>r</i> -sound, like <i>r</i> in Spanish <i>pero</i>

Symbol

Range of sound represented

Consonants

s	<i>ss</i> in <i>hiss</i> (but not <i>s</i> in <i>his</i>).
sh or s*	<i>sh</i> in <i>fish</i> . *See Instruction 6, below.
t	any kind of <i>t</i> .
th	hard English <i>th</i> as in <i>this</i> le.
v	English <i>v</i> .
w	English <i>w</i> .
x (= ks)	<i>x</i> in <i>extra</i> (not <i>x</i> in <i>exact</i>).
y	<i>y</i> in <i>yet</i> . Note that <i>y</i> is also used as a vowel-symbol (see above).
z	English <i>z</i> or the <i>s</i> in <i>was</i> .
zh (or ʒ)*	<i>j</i> in French <i>je</i> ; <i>s</i> in <i>measure</i> .
(')	(inverted comma) The Semetic sound represented by ʕ ('ain) in Arabic; the glottal stop. (In practice the two will not conflict.)

*See Instruction 6, below.

Instructions for spelling in the conventional alphabet

1. Standard native pronunciation is to be taken as the basis for spelling.
2. Each sound is to be represented by its closest corresponding symbol, and a symbol may be doubled only to indicate a clear repetition of the same sound.
3. If their representation be indispensable, a vowel-symbol may be marked with :
 - (a) an acute accent (') for *stress* (*Kórinthos*—Greece)
 - (b) a macron (¯) for *length* (*Tôkyô*—Japan)
 - (c) a tilde (~) for *nasalization* (*Eggã*—Nigeria, *unofficial*).
4. Retroflex, emphatic, implosive or ejective consonants may be indicated by dots beneath the symbols representing them.
5. Palatalization of consonants as in Russian may be indicated by an apostrophe (') after the symbol affected.
6. If it be imperative to distinguish between *sh* and *zh* (the symbols given above) and aspirated *s* and *z* respectively, the alternative symbols *ʃ* and *ʒ* may be used for the former pair. Similarly, *c* and *ch* could stand for the unaspirated and aspirated " ch " sounds respectively.
7. In the narrow rendering of names in, and their close transliteration into, the conventional alphabet, recommended for textual documents and particularly for gazetteers, the diacritical marks listed in 3, 4, 5 and 6 above, should be used. From the broad rendering in, and broad transliteration into the conventional alphabet, appropriate to maps and charts, these marks may be omitted. (This instruction applies only to the conventional alphabet and has no bearing whatever on No. 5 of the Principles of Nomenclature.)

Alphabetical order

The full conventional alphabet consists of the following thirty-seven symbols :

a, b, ch or c, d, dh, e, f, g, gh, h, i, j, k, kh, l, m, n, ñ or ny, ng, o, õ, p, q, r, s, sh or ʃ, t, th, u, ü, v, w, x, y, z, zh or ʒ, (')

but names written in it should be filed or arranged in common English alphabetical order disregarding (').

LAWS AND REGULATIONS APPERTAINING TO NAVIGATION

While, in the interests of the safety of shipping, the Admiralty make every endeavour to include in their hydrographic publications details of the laws and regulations of all countries appertaining to navigation, it must be clearly understood :—

- (a) *that no liability whatever can be accepted for failure to publish details of any particular law or regulation, and*
- (b) *that publication of the details of a law or regulation is solely for the safety and convenience of shipping and implies no recognition of the international validity of the law or regulation.*

INFORMATION RELATING TO ADMIRALTY CHARTS AND PUBLICATIONS, GENERAL NAVIGATION, AND GENERAL METEOROLOGY

ON THE CORRECTION OF ADMIRALTY CHARTS

Guides to Navigation.—In addition to the charts, the navigational publications which are primarily affected by the continual changes and alterations that take place are the Admiralty Sailing Directions, the Admiralty List of Lights, Fog Signals and Visual Time Signals, and the Admiralty List of Radio Signals. The Admiralty Notices to Mariners contain information mainly for the correction of the charts and navigational publications.

CHARTS

1. Degree of Reliance.—It should be clearly understood that the value of a chart depends on the character of the original survey and on the completeness of the reports of subsequent changes. The remarks on "The Use of Charts as Navigational Aids, &c." which are subjoined should be carefully studied in this connection.

2. System of Dating and Issue of Corrected Copies.—Admiralty charts after first publication are kept corrected by means of new editions, large corrections, and small corrections. Copies of charts issued by the Hydrographic Supplies Establishment, Admiralty Chart Agents or Admiralty Chart Depôts are corrected, except from temporary and preliminary Notices to Mariners, for all navigational information to the date of issue.

New Charts.—The date of publication of a chart is shown outside the bottom margin, in the middle, e.g. :—

Published at the Admiralty 30th May, 1947.

New Editions.—When a chart is revised throughout and modernised in style a new edition is published, the date being shown outside the bottom margin and to the right of the date of publication, e.g. :—

New Edition 2nd Jany., 1947.

All large and small corrections notations are at the same time erased, and all old copies of the charts are cancelled.

Large Corrections.—When a chart is corrected from important information which is too comprehensive to promulgate by Admiralty Notice to Mariners or to insert conveniently by hand on existing

copies, but when the chart is not revised throughout, the date on which these corrections are made is shown on the chart outside the bottom margin and to the right of the date of publication, and in the case of a chart already marked with a new edition date, below such date, e.g. :—

Large corrections 10th Feb., 1947.

All small corrections notations are at the same time erased, and all copies of the chart are cancelled.

Small corrections.—

- 10 (i) When a chart is corrected from the information promulgated in an Admiralty Notice to Mariners (except temporary and preliminary Notices), the year, if not already shown, and number of the notice are entered in the bottom left-hand corner of the chart, e.g. :—

15 *Small corrections 1947-903.*

Copies of the chart stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depôts are corrected by hand from such information.

- 20 (ii) Prior to 1954, when a chart was corrected from information which was considered of no importance from the standpoint of safe navigation, and which was, therefore, not promulgated in an Admiralty Notice to Mariners, the year, if not already shown, and date of the correction were entered on the chart, in one of two ways, in the bottom left-hand corner below the margin and in sequence, with the notations referred to in the preceding paragraph, e.g. :—

Small corrections, 1947—[5.20]—

or Small corrections 1947—(VI.25)

- 30 These indicated that the chart plate received minor corrections on the 20th May or 25th June, respectively, which would appear on later printings.

In such cases copies of the chart held by ships and establishments were not usually replaced by new copies, but in exceptional cases, e.g., when new compasses were inserted, new copies of the charts might be supplied. It should, however, be particularly noted that the absence of corrections represented by square or bracket dates from a chart did not invalidate it for navigation.

- 40 (iii) Since 1954, in order that more attention may be given to New Editions, Large Corrections and corrections by Notices to Mariners, and for other reasons, the making of minor corrections to Chart plates as in (ii) has been discontinued. Information of no importance to safe and convenient navigation is instead recorded for inclusion in the next New Edition or Large Correction ; or, for promulgation, in a later Notice to Mariners should a change of circumstance alter the importance of the information.

50 In consequence, the small correction date enclosed in a rectangle does not appear later than 1953 on navigational charts. The date within brackets may still appear and is then an indication that magnetic compasses have been corrected for a change in variation.

3. Correction of Charts in Ships.—All small but important corrections affecting navigation that can be made to the charts by hand are promulgated in Admiralty Notices to Mariners and, with the exception of corrections from temporary or preliminary Notices, should at once be neatly made in waterproof violet ink on the charts affected, the year (if not already shown) and numbers of the notices being inserted, also in waterproof violet ink, in the bottom left-hand corner of the chart. The recognised abbreviations shown on Admiralty chart No. 5011 ("Signs and abbreviations used on Admiralty Charts") should be used. 5 10

Generally speaking, the amount of information which should be inserted on a chart should be in accordance with that already shown.

On large scale charts, the abridged descriptions, as shown on chart No. 5011, of all details of all lights, light-buoys and fog signals, and the year dates of obstructions, reported shoals, dredged channels, 15 depth on bars or in shifting channels, and irregularities of lights, should be inserted.

On coastal charts, the abridged descriptions of only the principal lights and fog-signals, i.e., those to assist in approaching or making the land, should be inserted. 20

Particulars of such lights should be omitted, in the following order, as the scale of the chart decreases, viz. :—

- (i) Elevation, (ii) Period, (iii) Number in Group, and (iv) Visibility.

Particulars of fog signals should be inserted in their appropriate positions if space permits, but should otherwise be entered in a tabulated list under the title or some other convenient place on the chart. 25

Inner harbour light-buoys and beacons should not be inserted on coastal charts, and against other light-buoys only the character of the light should be inserted. 30

On ocean charts, lights which are visible 15 miles or over should alone be inserted and then only their character and colour.

On all charts, writing should be inserted as much as possible clear of the water, unless the relative objects are on the water, and care should be taken not to obliterate any information already on the chart. When cautionary or tidal notes, &c., are inserted, they should be written in a convenient but *conspicuous* place, preferably near the title, where they will not interfere with other details. 35

Erasures should never be made but the details should, when necessary, be crossed through in waterproof violet ink. 40

Admiralty Notices to Mariners are occasionally accompanied by reproductions of portions of charts (known as "blocks"), and when correcting charts from such blocks the following points should be borne in mind :—

- (i) A block may not only indicate the insertion of new information, *but also the omission of matter previously shown*. The latter would, however, invariably be mentioned in the text of the Notice, and the fact that a block accompanies a Notice should not cause the text of the Notice to be disregarded. 50
- (ii) The limiting lines of a block are determined for convenience of reproduction and need not be adhered to when cutting out for pasting on the chart, provided that the point mentioned in the preceding paragraph is taken into consideration. 55

- (iii) The new information shown on a block can sometimes be inserted on the chart by hand, the reason for issuing a block in such a case being to avoid a long description of the new information in the text of the Notice.
- 5 (iv) Owing to distortion the blocks do not always fit the charts exactly, care should therefore be taken when pasting a block on to a chart that the more important navigational corrections fit as closely as possible. This can best be assured by fitting the block while it is dry and making
- 10 two or three pencil ticks round the edges for use as fitting marks after the paste is applied.

Corrections from Temporary or Preliminary Notices to Mariners should be inserted on the charts *in pencil* and the year and number of the notice should be shown against them, e.g. :—N.M. 625/1947
 15 temp., and also in the bottom left-hand corner of the chart, in pencil, *below* the small corrections notations (*see* above). Temporary corrections should be rubbed out when the notice is received cancelling them, but preliminary corrections should be inked in when the notice is received reporting that the changes have been made.

- 20 Charts stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Dépôts are *not* corrected from Temporary or Preliminary Notices to Mariners, and when charts are received from one of these sources they should be corrected in pencil as necessary from the copies of such Notices
- 25 already held, or from those supplied with the charts.

Corrections from Radio Navigational Warnings concerning derelicts and drifting obstructions, the temporary extinction of lights, displacement of important aids to navigation, ice reports, &c., should also be noted *in pencil*, as received, on the charts affected. Radio
 30 Navigational Warnings of a permanent nature and those relating to derelicts and drifting obstructions dangerous to navigation are re-issued in the form of Admiralty Notices to Mariners, but other warnings are not re-issued in this way, except in special circumstances.

- Corrections from information received from authorities other than
- 35 the Admiralty should be noted, *in pencil*, on the charts affected, but no charted danger is to be expunged without the authority of the Hydrographer of the Navy.

NAVIGATIONAL PUBLICATIONS

- 1. **Admiralty Sailing Directions, Supplements, &c.**—The Admiralty
- 40 Sailing Directions, consisting of about 73 volumes for the whole world, contain general information useful to the navigator.

An index chart bound near the beginning of each volume shows the area dealt with and the serial numbers and limits of all Admiralty charts for the area which were published *when the volume was printed*.

- 45 Each volume is periodically revised throughout, and, in the intervals between the publication of new editions, Admiralty Notices to Mariners and Supplements are published to enable the volume to be corrected. It should, however, be clearly understood that Sailing Directions cannot be correct in all minor details after the date of the
- 50 latest Supplement.

The above-mentioned corrections are not made in the Sailing Directions stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Dépôts.

A new edition of each volume of Sailing Directions is published at

intervals of approximately from ten to twelve years. The number of the latest Admiralty Notice to Mariners used in its compilation is given in the "Advertisement" on page iii of each volume, and the numbers of the Notices affecting it between the dates of going to press and issue to ships and establishments are given in the Notice 5 announcing its publication, to enable the new edition to be corrected before being brought into use.

A Supplement to each volume is generally published annually, each succeeding Supplement cancelling the former. When a volume is taken up for revision, however, no further Supplement to that edition 10 is issued, but subsequent Notices to Mariners affecting it are summarised each year and issued as a separate publication, until the new edition of the volume is published.

A tabular form for notation of the existence of Supplements and Summaries of Notices is printed on the front fly-leaf of all Sailing 15 Directions, and these notations are made as necessary in all copies issued by the Hydrographic Supplies Establishment and the Admiralty Chart Depôts.

Supplements and Summaries of Admiralty Notices to Mariners should be retained intact. *Whenever reference is made to the Sailing 20 Directions, the Supplement, and where applicable the Summary, must be consulted.* The existence of a Supplement or Summary of Admiralty Notices to Mariners is to be entered in the tabular form inside the cover of the Sailing Directions. New and amended information appearing in the Supplements for the first time is indicated by square 25 brackets, and deletions from the previous Supplement are indicated by horizontal lines.

Admiralty Notices to Mariners affecting Sailing Directions *are not* to be cut up and pasted in, but the book is to be annotated in the margin, or corrected in manuscript, as convenient. 30

2. The Admiralty List of Lights, Fog Signals and Visual Time Signals.—The Admiralty List of Lights, Fog Signals and Visual Time Signals for the work is issued in twelve volumes divided geographically as shown on the index chart at the beginning of each volume. 35

Light-buoys are *not* included in the list.

The volumes are published annually at the rate of one volume per month; however, if there are insufficient corrections to justify the publication of a new edition of any volume, this will be notified by Notice to Mariners. 40

Each volume will be issued with an inscription on its cover and title page stating the date to which the volume has been corrected, which will be approximately eight weeks prior to the date of its issue. Corrections or additions to each volume, which may occur between the date of correction and date of issue, will be promulgated by Section III 45 of the Weekly Edition of Admiralty Notices to Mariners announcing the publication of the new volume.

Amendments.—Important amendments are promulgated in Admiralty Notices to Mariners. In Section III of each Weekly Complete Edition of these Notices will be found additions and alterations made 50 to Lights, Fog Signals and Visual Time Signals by the Notices issued during the week affected; this section also includes other amendments, particularly amendments of a Temporary nature, which have not yet (or will not) necessitated the issue of a Notice to Mariners.

Corrections to the Light Lists may be extracted from Section III 55 and pasted in the appropriate volume.

Note.—Corrections are not made in copies of the Lists of Lights, &c., stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts, and copies received from these sources should accordingly be corrected from the weekly editions of the Notices to Mariners before being brought into use.

3. The Admiralty List of Radio Signals.—The Admiralty List of Radio Signals is issued as follows :—

Volume I.—Communications—Comprises particulars of radio-telegraph coast stations, together with general regulations ; it also includes such subsidiary services as medical advice supplied by radio.

Volume II.—Navigational Aids—Comprises particulars of services from direction-finding stations and radiobeacons, including air radiobeacons useful to ships ; also stations giving QTG service and calibration stations ; all relevant codes and regulations will be found in this volume.

Volume III.—Meteorological Services—Comprises particulars of weather services provided for the use of shipping, together with relevant codes.

Volume IV.—Meteorological Observation Stations.

Volume V.—Comprises particulars of Radio time signals, Uniform time system, navigational warnings and Position fixing systems (Decca, Loran Consul, etc.).

New editions of each volume will normally be published annually.

All corrections subsequent to the date of publication are promulgated in Section VI of the complete weekly edition of Admiralty Notices to Mariners.

Copies of the List stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts are not kept corrected, and Lists received from these sources should accordingly be corrected from the weekly editions of the Admiralty Notices to Mariners before being brought into use.

4. The Admiralty Tide Tables.—The Admiralty Tide Tables are published in three sections as follows :—

For " EUROPEAN WATERS (including Mediterranean Sea)."

For " ATLANTIC AND INDIAN OCEANS."

For " PACIFIC OCEAN AND ADJACENT SEAS."

Each section contains two parts, Part I giving tidal predictions for Standard Ports and tidal stream predictions for certain straits and channels. Part II giving data for predicting tides at places which are not Standard Ports.

Admiralty Tide Tables, Part III, contains instructions for predicting tides and tidal streams, and for analysing observations of tides and tidal streams, with tables to assist prediction and analysis.

THE USE OF CHARTS AS NAVIGATIONAL AIDS AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION

(1) **Reliance on a chart.**—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger the scale of the chart.

To estimate this the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and, until a plan founded

on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail. 5

It appears to be insufficiently realised that the degree of reliance which may reasonably be placed upon an Admiralty chart, even in surveys of modern date, is mainly dependent on the scale on which the survey was made. The scale for publication is now generally that of the original survey, except in the case of coast sheets which are sometimes reduced. It should not, therefore, be assumed that the original survey was made on a larger scale than that published. 15

It must be borne in mind that the principal method of ascertaining the inequality of the bottom of the sea is by the laborious process of sounding, and that in sounding over any area, the boat or vessel obtaining the soundings is kept on given lines; that each time the lead descends, or a sonic sounding is taken, the depth over only a small area is obtained, in the case of the lead, it has a diameter of only a few inches, and that consequently each line of soundings, though miles in length, is only to be considered as representing a narrow width. 20

Surveys are not made on uniform scales, but each survey is made on a scale commensurate with its apparent importance. For instance, a general survey of a coast which vessels only pass in proceeding from one place to another is not usually made on a scale larger than one inch to the nautical mile, while surveys of areas where vessels are likely to anchor are made on a scale of three inches to the mile, and surveys of frequented ports or harbours likely to be used by fleets, on a scale of from six inches to ten inches to the nautical mile. 30

Close examination by sounding is the only method by which surveys on a large scale can be made, and in view of the vast mileage of surveys yet requiring completion in the interests of navigation, it would be a waste of time to undertake large-scale coast surveys. 35

The scale on which a survey is to be conducted having been settled, it is manifestly superfluous to obtain more lines of soundings than can be represented on the paper. 100 soundings, which is the maximum number that can be placed with clearness on every square inch of paper, means that on a scale of one inch to the mile each sounding on the chart occupies an area representing eight acres of actual ground, whilst on a scale of six inches to the mile each sounding represents an area of a little less than a quarter of an acre, i.e., of 100 feet square. 40

The following diagram represents as many soundings as can be placed legibly on a square inch of paper :— 45

16	15	15	13	13	14	12	11	10	9
14	14	14	14	13	13	12	11	9	8
15	15	14	17	16	14	13	10	10	9
16	16	17	18	16	12	11	8	9	10
18	17	15	12	9	7	7	7	9	10
19	16	12	9	5	4	5	6	8	9
22	19	16	10	3	5	6	7	8	10
20	16	12	7	5	6	6	7	8	10
18	15	11	9	7	7	7	8	10	11
20	17	14	11	12	10	9	10	11	13

Little assistance in detecting excrescences on the bottom is afforded by the eye, when sounding in a boat, even in clear water, on account of the observer being within five feet of the surface ; none in turbid seas. If, therefore, there is no inequality in the soundings to cause
 5 suspicion, a shoal patch between two lines may escape detection.

Thus, in a chart on a scale of one inch to the mile, an inequality of some acres in extent rising close to the surface, if it happened to be situated between two lines, might escape detection ; whilst in a chart on a scale of 6 inches, inequalities as large as battleships,
 10 if lying parallel with, and between the lines of soundings, might exist without detection if they rose abruptly from an otherwise even bottom.

General coast charts should not, therefore, be looked upon as infallible, and a rocky shore should on no account be approached within the ten-fathom contour line, without taking every precaution
 15 to avoid a possible danger ; and even with surveys of harbours on a scale of 6 inches to the mile vessels should avoid, if possible, passing over charted inequalities in the ground, as some isolated rocks are so sharp that the lead may not find the highest part. Better results can, however, be obtained by sonic sounding owing
 20 to the rapidity with which such soundings can be taken, but even this method will not find rocks unless the boat or vessel be directly over them.

Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are
 25 deep it may with fairness be assumed that in the blanks the water is also deep ; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion.

Soundings in hair line, which are shown on the latest charts in
 30 upright figures, and on other charts in sloping figures, indicate that such soundings have been taken from smaller scale charts, an unreliable source, or adapted from old and imperfect surveys.

(2) **Fathom lines a caution.**—Except in plans of harbours that have been surveyed in detail, the six-fathom line on most Admiralty
 35 charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the
 40 necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shore in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, as before mentioned,
 45 another warning, especially for ships of deep draught.

Charts on which no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

50 Isolated soundings, shoaler than surrounding depths, should always be avoided as there is no knowing how closely the spot may have been examined.

(3) **Chart on largest scale always to be used.**—It sometimes happens that from press of work, only the copper plate of the larger scale
 55 chart of a particular locality can at once receive any extensive re-arrangement of coastline or sounding. This is an additional reason,

besides the obvious one of the greater detail shown, why this largest scale chart should always be used for navigating.

(4) **Caution in using small-scale charts.**—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards 5 on a large-scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile.

For the same reason bearings to near objects should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the 10 line to be drawn.

(5) **Graduation.**—All plans are now being graduated in skeleton style before publication in order to facilitate easy reference to geographical positions ; previously published plans are also graduated 15 as opportunity offers. The graduation is, however, of necessity often based upon imperfect information of a conflicting nature ; for this reason, whenever a geographical position is quoted other than approximate (i.e., when seconds are given), it is necessary to quote also the number of the particular chart from which the position has 20 been derived.

In this connection it is pointed out that, whenever possible, a position should be transferred from one chart to another by bearing and distance from a distinguishing feature common to both, such as a point of land or a light, &c., and not by the graduation which 25 may differ owing to one of the charts being constructed on later and more complete geographical data than the other.

(6) **Distortion of printed charts.**—The paper on which charts are printed is, from various causes, subject to distortion, but the effect of this is seldom sufficient to affect navigation. It must not, however, 30 be expected that accurate series of angles taken to different points will always exactly agree when carefully plotted upon the chart, especially if the lines are to objects at some distance. The larger the chart the greater the amount of this distortion.

(7) **Buoys.**—It is manifestly impossible that any reliance can be 35 placed on buoys always maintaining their exact position. Buoys should, therefore, be regarded as warnings and not as infallible navigating marks, especially when in exposed positions ; and a ship should always, when possible, be navigated by bearings of fixed objects on shore or angles between them, and not by buoys. 40

(8) **Light-buoys.**—The lights shown by light-buoys cannot be implicitly relied on, as, if occulting or flashing, the apparatus may get out of order, or the light may be altogether extinguished. These lights in the British isles are from 5 to 217 candle-power.

(9) **Cable-buoys.**—Cable-buoys marking the ends of submarine 45 cables usually are spherical or can-shaped, surmounted by a globe and occasionally a flag. Below the topmark two *white fixed* lights, disposed horizontally, may be exhibited, but they cannot be implicitly relied on.

(10) **Lights.**—Arcs drawn on charts round a light are not intended 50 to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights which do not show the same characteristics or colours in all directions, the bearings between which the differences occur.

All the distances given in the Admiralty List of Lights and on the 55 charts for the visibility of lights are calculated for a height of an

observer's eye of 15 feet. The table of distances visible due to elevation, at the beginning of each volume of the Admiralty List of Lights, affords a means of ascertaining how much more or less the light is visible should the height of the eye be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its candle power, as given in the Admiralty List of Lights, and in some cases by noting how much its visibility in clear weather falls short of the range due to the elevation at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its elevation would permit it to be seen over 20 miles, if of any power. (See table in the Admiralty List of Lights.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip, it may be determined whether the vessel is in the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

(11) **Fog signals.**—Sound is conveyed in a very capricious way through the atmosphere. The following points in regard to fog signals should be borne in mind :—

- (a) Fog signals are heard at greatly varying distances.
- (b) Under certain conditions of atmosphere, when an air fog signal is a combination of high and low tones, one of the notes may be inaudible.
- (c) There are occasionally areas around a fog signal in which it is wholly inaudible.
- (d) A fog may exist a short distance from a station and not be observable from it, so that the signal may not be sounded.
- (e) Some fog signals cannot be started at a moment's notice after signs of fog have been observed.

Mariners are therefore warned that fog signals cannot be implicitly relied upon, and that *the practice of sounding should never be neglected.* Particular attention should be given to placing "Look-out men" in positions in which the noises in the ship are least likely to interfere with the hearing of the sound of an air fog signal; as experience shows that, though such a signal may not be heard from the deck or bridge when the engines are moving, it may be heard when the ship is stopped, or from a quiet position. It may sometimes be heard from aloft though not on deck.

Great assistance may be obtained from radio beacons at many important lighthouses and light-vessels, but the attention of Mariners is called to the serious dangers which may arise from their misuse. No attempt should be made to approach such a position on a radio

bearing, whilst relying only on hearing the sound fog signal in sufficient time to alter course to avoid danger. When the radio fog signal is transmitted from a light-vessel, it is essential in order to avoid collision, that the bearing from the light-vessel should not be kept constant.

(12) **Tides.**—In navigating coastal waters where the range of the tide is considerable, caution is always necessary. The tidal predictions for Standard ports in the Admiralty Tide Tables can generally be relied upon to give the times of high and low water to within a few minutes, and heights within a few tenths of a foot. Larger errors are to be expected in the predictions for places which are not Standard ports, computed from the data in Part II, but such predictions computed from the harmonic constants are always sufficiently accurate for the general requirements of navigation. For Standard ports the heights of the tide at times between high and low water may usually be found within narrow limits in accordance with the instructions in Parts I and III of the Tide Tables.

The datums of Admiralty charts depending on Admiralty surveys vary with the type of tide, but usually conform with the International agreement, that datum should be "a plane so low that the tide will but seldom fall below it." The datums used by different nations, however, differ very considerably and those of Admiralty charts depending on foreign surveys are always those used by the original surveyors, which vary from "lowest possible low water" to "mean low water" in tidal waters, and are usually mean sea level in non-tidal waters.

The datum used is always stated on large-scale Admiralty charts.

Caution.—Most datums are above the lowest level to which the tide may fall; the charts therefore do not always show minimum depths.

(13) **Tidal streams.**—Where the tidal streams are semi-diurnal information regarding them is usually given, in a convenient part of the chart, in tabular form or by notes, special symbols being inserted at the positions to which the information refers. In certain cases, where the information available is incomplete, the streams are indicated by means of arrows.

There are many places where the tidal streams cannot be predicted by reference to the tide at a Standard port. Although no data for predicting the times at which they flow is given, their general direction is, in many cases, indicated by arrows on the charts. For a few of the straits and channels, where these conditions exist, tidal stream predictions are given in the Admiralty Tide Tables.

Tidal streams, particularly if rotary, may vary considerably both in direction and rate; predictions of the stream must therefore always be considered approximate.

The turn of the tidal stream is not usually coincident with the times of high and low water; in fact, though in estuaries, harbour entrances, &c., the stream usually turns at about the times of high and low water, in open channels, and along open coasts generally, the turn usually occurs more nearly at half-tide. Predictions of the times of high and low water must therefore never be used as predictions of the times of slack water.

It should be remembered that, even where the general direction of the stream is parallel with the shore, an indraught is usually experienced when crossing the entrances to bays and inlets.

(14) **Fixing positions.**—For further information on this subject, see Admiralty Manual of Navigation.

When in sight of land, every opportunity should be taken of fixing the ship's position by terrestrial objects.

(a) *Simultaneous bearings or angles.*—The most usual method is by compass bearings of suitable objects, and it must be borne in mind that a fix by only two bearings is liable to error, either an absolute error in taking the bearings, or those made in applying the deviation or in laying the bearings off on the chart. For these reasons, a third or check bearing of some other object should, when possible, be taken, especially when near the shore or dangers. The coincidence of the resulting three lines will prevent any mistakes if the objects are suitably placed.

The position may also be fixed by observing horizontal sextant angles of well-defined suitably placed objects. These angles may be plotted on the chart with a station-pointer. Two conditions are, however, necessary to its successful employment; first, that the objects be well chosen; and, second, that the observer is skilful and rapid in his use of the sextant and station-pointer. For the former, reference can be made to the pamphlet on the use of the station-pointer, or to the Admiralty Manual of Navigation; the latter is only to be obtained by practice.

It will readily be seen that a sextant often offers as advantages, angles can be obtained from any position whence the objects are visible, and the fix is in no way dependent on the compass.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

In all cases where great accuracy of position is required, such as the fixing of a rock or shoal, or the addition to a chart of fresh soundings or new buildings, angles should invariably be used. In such cases angles should be taken of a number of objects, five being a good number, since this not only fixes the position beyond doubt, but also affords a useful check on the accuracy of the chart itself. When running a line of soundings it is only necessary to take a third angle every now and then, firstly to make certain that the more important soundings, as at the end of a line, are correctly placed, and secondly to check the general accuracy of the chart.

Sometimes when only one of the selected objects is visible from the compass, a compass bearing of it and a sextant angle to the other may be used to fix the position.

(b) *Simultaneous bearing and distance.*—Attention is also directed to the very useful and handy method of fixing by the bearing and distance of a suitable object.

Should the ship be supplied with ranging equipment, its use here is obvious, but without it a very good approximate distance of an object of known height may be obtained by observing its angle of elevation and obtaining its distance from Lecky's Offshore Distance Tables, which are supplied with all sets of charts. Full directions for the use of these Tables are given with them.

(c) *The running fix.*—If two position lines are obtained at different times the position of the ship may be found by transferring the first position line up to the time of taking the bearing for the second position line. The point of intersection of the second and the transfer-

red position line is the ship's position at the time of the second observation.

The accuracy of this fix will depend on the accuracy of the estimated run (over the ground) between bearings and, therefore, it is essential to take great care that an accurate allowance is made for 5 tidal stream, current, and leeway experienced by the ship during this interval.

The method of fixing by doubling the angle on the bow is useful when passing points of land, &c., in waters where there is either no tidal stream or current, or where this can be estimated with sufficient 10 accuracy.

This method is as follows :—

Suppose that the angle between the ship's head and an object is measured, and found to be X° , and that the time of the observation is noted. Suppose also that the time is again taken when the angle 15 between the ship's head and the object is $2X^\circ$. Then, if the course made good is the course steered, the distance of the ship from the object at the time the second bearing was taken is equal to the run (over the ground) in the interval. Hence the ship's position can at once be laid off as a bearing and distance from the object. In practice 20 the angle X should not be less than about 25° .

The most usual form of this method, the so-called "four-point" bearing, gives a good fix for a departure, but does not ensure safety, as the point and any dangers that may lie off are abeam before the position is obtained. 25

The above fix is reliable when there is no tidal stream or current or when it runs directly with or against the course of the ship. When the stream or current runs across the course of the ship or when leeway is to be allowed for, this method should never be used and the ship's position should be obtained by plotting the two bearings as a 30 running fix.

A table "Distance of an object by two bearings" is supplied with certain chart folios, and is also given in Inman's Tables, by which the ship's position at the second bearing can be found: any two bearings at a suitable angle to each other may be used, together with 35 the run between them, but, again, this table should not be used when the vessel is subject to a cross tidal stream or leeway.

(d) *The danger angle*.—The use of the danger angle in passing out-lying dangers with land behind them should also not be forgotten.

A vertical danger angle is useful when the danger lies off an object 40 such as a lighthouse, the height of which is known; the angle being obtained from the aforesaid Lecky's Tables. If a horizontal danger angle between two objects is used, however, caution is necessary, as, should the objects not be correctly placed on the chart, the angle taken from it may not serve the purpose. This method should not, 45 therefore, be employed when the survey is old or manifestly imperfect.

(e) *The astronomical position line*.—When fixing by astronomical observations, attention is drawn to the great utility of the position line. Even a single position line may at times give invaluable information, as the ship must be somewhere on this line, provided that the 50 chronometer error is accurately known.

A sounding obtained at the same time may often serve to give an approximate position. Again, by steering along, or at a required distance parallel to, a single position line, a vessel may make her port or avoid a danger, although uncertain of her position. 55

A very accurate position may be obtained by observations of three

or more stars at evening or morning twilight, or by the observation of a bright star at daybreak and another shortly afterwards of the sun when a few degrees (not less than 10°) above the horizon. The position lines obtained from the bodies observed should differ in
5 azimuth by 30° or more.

Mariners are also reminded that, with modern tables for correcting the altitude, observations of the moon entail practically no more calculation than those of a planet. Moon sights are sometimes available when stars are obscured by light cloud, &c. ; also, an excellent
10 position may frequently be obtained by simultaneous observations of the sun and moon.

(f) *The radio position line.*—A number of radio systems of which the principal ones are M/F D/F, Radio Beacons, Consol Beacons, Loran, Gee and Decca, are now in general use from which position
15 lines or fixes may be obtained.

The accuracy and range which may be obtained from these systems vary considerably ; their great advantage over other methods lies in the fact that they can be employed under all weather and visibility conditions, though in some cases the results obtained will vary
20 between day and night.

Special receiving equipment is generally required in order to make use of the radio signal, and some systems require special lattice charts or tables for plotting the position lines. Full details of these systems and their coverage areas are contained in Admiralty List of Radio
25 Signals, Volumes II and V.

The mariner should appreciate that with the position-fixing systems the accuracy of a fix will depend on three factors :—

- (i) The distance of the observer from the transmitters.
- (ii) The bearing of the observer from the base line joining the pair
30 of stations which he is using.
- (iii) The angle of intersection of the hyperbolic position lines.

It should be apparent from the inspection of any lattice chart that an inherent small equipment error, or a small personal error that may occur at the receiver, will cause a geographical error of varying amount
35 according to the observer's position.

It is important to realise that accurate equipment is no guard against the vagaries of the propagation of radio waves. The beacons and systems operating on medium and low frequencies are liable to " night error " in areas where the ground and sky waves are received
40 with equal strength ; these areas will occur at ranges depending upon the particular frequency used by any beacon or system. Where the transmissions of two stations are synchronised to provide one signal reading and position line, " night error " will be a minimum along the normal to the base line joining the pair of stations, and a maximum
45 towards the limits of their service sector.

Little is yet known about the effects of hills and discontinuities in the terrain (such as cliffs) on the speed of medium-and low-frequency radio waves.

At the other end of the radio spectrum the transmissions of systems
50 operating on the very high frequencies are subject to distortion in abnormal atmospheric conditions.

(g) *Fixing by radar.*—Radar may also be of considerable assistance when navigating in coastal waters in low visibility or at night. It is essential, however, to appreciate the limitations of a radar set when
55 interpreting the information obtained from it. It must be remembered that the radar horizon is only slightly farther than the visual

horizon would be, in good visibility, for a height of eye equal to the height of the radar aerial. Hence no echoes will be received from a coastline lying below the radar horizon, while echoes may be received from high ground farther inland which will give a misleading impression of the range of the nearest land. 5

Depending on the width of its beam, the bearings from a radar set tend to be inaccurate. It is therefore preferable when fixing by radar to use ranges rather than bearings. It is then most important to consider carefully the identity of the object giving the echo, using the bearing as an indication, and the height of the object to determine 10 whether it will appear on the radar presentation. Radar Range Nomograms are useful in deciding this, but a satisfactory result can be obtained by using "Distance to Sea Horizon Tables."

When two or more objects on the radar presentation have been selected and positively identified, a satisfactory fix can be obtained 15 by striking arcs on the chart with the radar range of the selected objects. These arcs intercept at the ship's position. Best results will be obtained by using isolated objects such as detached lighthouses, rocky islets, and the extremities of long piers or jetties, but where no such objects are available a steep coastline with cliffs should be used. 20 Flat or gently shelving coastlines, such as mud flats or sand dunes, should not be used since it is difficult to identify any portion of them on the radar presentation. Identification is assisted in some areas by fitting objects, such as buoys and beacons, with radar reflectors, causing them to return strong echoes. Attention is drawn to the 25 symbols with which such objects are marked on Admiralty Charts, and which are given in the latest edition of Chart No. 5011, "Explanation of signs and abbreviations used on Admiralty Charts."

The difficulty of positive identification of objects is largely reduced if a Chart Comparison Unit is used in conjunction with the navigational radar. Fixes obtained with this equipment employ, in principle, 30 an infinite number of ranges of the terrain in the vicinity of the ship, and in so doing a satisfactory fix will normally be assured.

In addition, radar beacons are available in some areas. Details of these and their use are given in the Admiralty List of Radio Signals, 35 Volume II.

(15) Observations for errors of the compass.—No opportunity should be neglected for checking the error of the compass. When coasting, and a well-surveyed and fairly large-scale chart is available, an excellent method of observing the error is by taking the compass 40 bearing of two suitable objects when in transit, and comparing this with the charted bearing; there should be sufficient distance between the objects to provide a sensitive transit. When this method is not available the error should be obtained by azimuths of a heavenly body. Errors should be observed on any change of course on which 45 the ship is steadied for a reasonable time, and at least twice a day when steering a steady course for long periods.

(16) Change of variation of the compass.—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the 50 purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long, the displacement of position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a degree, but the chart plates cannot be corrected more frequently 55

from the impossibility of making alterations often on one spot in a copper plate.

The geographical change in the variation is in some parts of the world sufficiently rapid to need consideration. For instance, in 6 approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles, and in the English channel about 5° in 400 miles. The Variation chart should be consulted on this head.

On certain general charts embracing large areas with considerable change of variation, true compasses are placed instead of magnetic 10 compasses, the variation being shown by *isogonic lines* (curves of equal magnetic variation), in a similar manner to the Variation chart. One or two *isogonic lines* are also sometimes placed on charts, in addition to the magnetic compasses, in order to indicate the general direction of these curves, and thus facilitate the determination of the 5 variation to be employed in portions of the chart not in immediate proximity to any one of the engraved compasses. Magnetic variation values shown on Admiralty charts are for the 1st July of the year mentioned.

(17) Local magnetic disturbance of the compass on board ship.—

20 The term "local magnetic disturbance" has reference only to the effects on the compass of magnetic masses external to the ship in which it is placed. Observation shows that such disturbance of the compass in a ship afloat is experienced only in a few places on the globe. Magnetic laws do not permit of the supposition that it is 25 the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such a rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

30 Such deflections of the compass are due to magnetic ores in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together. Such areas are depicted 35 by a special symbol on charts, and the cause of the magnetic disturbance is referred to as a Local Magnetic Anomaly.

They may also be due to wrecks lying on the bottom in moderate depths, but investigations have proved that, while deflections of unpredictable amount may be expected when very close to such wrecks, 40 it is unlikely that deflections in excess of 7° will be experienced, nor should the disturbance be felt beyond a distance of 250 yards.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

45 **(18) Use of oil for modifying the effect of breaking waves.—**Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully 50 applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows :—

1. On free waves, i.e., waves in deep water, the effect is greatest.
2. In a surf, or waves breaking on a bar, where a mass of liquid is 55 in actual motion in shallow water, the effect of the oil is uncertain, as

nothing can prevent the larger waves from breaking under such circumstances ; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use ; crude petroleum is serviceable when nothing else is obtainable ; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing. 10

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.

At anchor, when the sea is sufficient to render it difficult to hoist up or in boats, oil bags from forward or from the swinging booms have been found to render the sea alongside comparatively smooth. 15

7. In cold water, the oil, being thickened by the lower temperature and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be : hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil. 20

The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow and allowed to tow in the water. 25

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts. 30

9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted. 35

On a bar with the ebb tide it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the depth of the water. 40

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary. 45

12. Towing a vessel in a heavy sea, oil is of the greatest service, and may prevent parting the hawser. Distribute from the towing vessel forward and on both sides ; if used only aft the tow alone gets the benefit. 50

(19) **Mirage and abnormal refraction.**—An unusual lapse rate of temperature (and therefore density as well) with height immediately above the sea (or land) surface produces a distortion in the appearance of objects near the horizon ; such a phenomenon is known as mirage. 55

When the surface is relatively cold (and the wind very light) so that the density of the air decreases rapidly for a short distance above the surface, light rays from objects low down near the horizon are bent down, the same way in fact as are usually the rays of the sun when
 5 entering the earth's atmosphere at a low altitude. The effect is to render visible objects that are normally below the horizon, e.g., lights may be "raised" at night at much greater distances than one would ordinarily expect. This phenomenon is known as "looming."

A further occasional effect produced when the air is appreciably
 10 warmer than the sea, is "superior mirage" in which an inverted image is seen over the real object; sometimes an erect image is seen immediately above and touching the inverted one. The object and its images in this instance are well defined in contrast to the shimmering object and image of the inferior mirage. Superior mirage is most
 15 often experienced in high latitudes and wherever the sea surface temperature is abnormally low.

"Inferior mirage," the effect of which is to decrease the distance at which objects are visible in a horizontal direction, is due to a rapid increase of density with height close to the surface such as occurs
 20 when air of comparatively low temperature blows over a warmer sea, or over a tarred road or desert when a hot sun is beating down on it. In either event light rays are bent up when approaching the surface where the density of the air is much less than above. The coastline, and at times a ship or island, may appear to be floating in air above
 25 a shimmering horizon, possibly with, in the former instance, her hull either invisible or with an inverted image underneath. Inferior mirage is comparatively uncommon at sea and is more likely to be observed along a coastline than well out to sea.

When mirage is evident caution must be used in taking sights with
 30 a sextant, for abnormal refraction must necessarily be present also. With inferior mirage better, but not normal, results will usually be obtained by ascending as high as possible in the ship; with superior mirage the height of eye should be as low as possible. It is, however, advisable, whenever abnormal refraction is suspected, to measure the
 35 elevation of the celestial body above the back as well as the front horizon, as explained in navigational text-books.

(20) **Aurora.**—The most common form of aurora is an arc system, single or multiple, narrow and well defined, or broad and diffuse, and centred on the magnetic meridian.

40 The most usual colour is pale whitish green when the auroral activity is weak and diffuse: but when the aurora arises high towards the zenith in the form of rays, rayed curtains and draperies with much rapid movement of the constituent rays, the colours sometimes become much stronger and more vivid, and include bright green, red and
 45 violet. When the curtains forming the aurora converge to form a corona, which may rotate very rapidly about the point of convergence, the displays may become very complex, filling practically the whole sky, and extending far to the equatorial side of the zenith with much rapid movement and change of colour from instant to instant.

50 Though the most usual duration of auroral displays in these high latitudes is several hours, they not infrequently last throughout the whole night from dusk to dawn. In such long displays the really intense and violently active periods with vivid strong colours are generally confined to spasms of 15–30 minutes, with the intervening
 55 periods filled with diffuse glows or quiet arc systems.

The absolute intensity of the light of the aurora is seldom great, and

the brighter stars usually glimmer through it. In the most vivid and intense displays, the light may equal, but rarely surpasses, that of the full moon in a cloudless sky. It may give enough light to read by. On such occasions the aurora may be visible to some extent in partial twilight.

5

Though in high latitudes aurora occurs any time in the dark hours it is probably most frequent in the late evening hours from 9 p.m. till midnight or just after ; it is more frequent in the equinoctial months than at other times and has a well-defined 11-year period of activity following the cycle of solar activity. A maximum of activity occurred 10 in 1948, and the interval from maximum to minimum activity usually occupies a period of about 6 to 7 years. In high latitudes this cycle of activity is reflected more in the intensity and vividness of the displays than in their frequency of occurrence. Though really outstanding displays tend to occur around the years of maximum activity they 15 may occur at any time of the cycle, except perhaps near the absolute minimum.

In addition to this 11-year cycle of activity active periods tend to recur at intervals of 27 days. (See Magnetic Storms.)

Northern hemisphere.—Aurora Borealis occurs most frequently along 20 a zone which forms an approximate oval, of average radius 23° , with centre in the extreme north-west of Greenland. This zone of maximum frequency crosses Hudson Bay and the Labrador coast in about lat. 58°N . It runs south of Cape Farewell and along the south coast of Iceland. It lies just north of North Cape, touches the extreme north 25 of Novaya Zemlya, skirts Cape Chelyuskin and then eastward just north of Wrangel Island into the north of Alaska. Along this zone aurora of some kind can probably be seen every suitable night when the sky is clear ; 250 miles outside this maximum zone to the southward the auroral frequency decreases sharply to about 70–100 nights a 30 year on the average, and to 20–25 nights 500 miles south of the maximum zone. Inside the maximum zone the geographical distribution of frequency is not so well established but it probably falls off more gradually than it does outside.

On the zone of maximum frequency itself aurora appears as fre- 35 quently to the south of the zenith as to the north, but with increasing distance outside the zone the appearances concentrate more into the northern sky ; the reverse is true inside the zone.

Southern hemisphere.—The frequency and distribution of Aurora Australis is not fully known. It is probable that it is more frequently 40 seen at sea between about long. 50°E . and 175°W . than in other longitudes. Very fine displays have occasionally been seen in Australasia and on passages across the Southern Ocean. There is nevertheless a general impression that aurora is less frequent in the southern than in the northern hemisphere. This is probably to be accounted for by 45 the fact that, apart from whaling and exploring expeditions, ships' tracks in general do not extend to such high latitudes as in the northern hemisphere.

The zone of maximum auroral frequency is roughly annular and is near the circumference of a circle of radius about 1,080 miles, centred 50 in about lat. 75°S ., long. 129°E . The frequency falls off both outside and inside this zone. A large part of the zone is within the continent of Antarctica.

(21) **Magnetic storms.**—Magnetic storms vary in intensity and frequency with the sunspot cycle, similarly to aurorae. An intense 55 magnetic storm is always accompanied by a bright and active aurora.

The deeply coloured aurorae, showing more pronounced red and green, and sometimes also blue and violet, tints, are invariably connected with magnetic storms of considerable or great intensity. Such a storm will produce simultaneous aurora in both hemispheres. In the greatest storms aurorae in some form may be visible down to about 20° north latitude in certain parts of the oceans, especially between the meridians of 30°W. and 140°W. Magnetic storms vary greatly in duration from a few minutes to several days; they are generally more intense during the hours of darkness. Long-continued storms usually show great fluctuations with periods of complete or partial quiescence. Similarly the associated aurora fluctuates between active and quiescent forms.

The origin of magnetic storms and aurorae is not yet fully understood, but they are intimately connected with the state of a local area of the sun. As the same part of the sun is again presented to the earth after an interval of about 27 days, a magnetic storm and aurora may recur at this time, usually in less intense form.

A ship's compass may tend to deviate during the progress of a considerable magnetic storm. In more intense storms the compass needle may oscillate 1° or more either side of its normal position.

Such oscillation may persist for as long as 10 or 20 minutes before dying out. Further oscillation may occur after a period of quiescence. Deviations of 2° or more are rare, but during the great magnetic storm and aurora of January 25th, 1938, one of 4° to the eastward was observed off the Portuguese coast. During a severe magnetic storm the compass may be deflected continually in one direction to the extent of about half a degree for some hours. When bright aurora is seen, especially if it is of the more deeply coloured and rapidly moving kind, and particularly when it is observed in low latitudes, the possibility of deflections of the compass should always be borne in mind.

During a considerable magnetic storm freak wireless reception may occur on certain waves and short-wave transmission may fade to complete silence. Beam radio communication, especially in a west-east or east-west direction, may be interrupted. Such conditions may last in some degree over a period of several days, at times when the sun is unusually active. Short-wave fading also occurs occasionally from a different form of solar disturbance known as a "bright eruption," when this is very intense. On the average such fading begins about 7 minutes after occurrence of the bright eruption and may last 5 or 10 minutes, gradually returning to normal within a period of 40 to 45 minutes. These fadings are confined to the daylight hemisphere of the earth, while the magnetic storm fadings may occur by day or by night.

(All the following articles do not apply to every Pilot, but articles applicable to this Pilot will be referred to in the Climate and Weather Section in Chapter I.)

(1) **Lows.**—A low, or depression, appears on a synoptic chart as a series of isobars roughly circular or oval in shape, surrounding an area of low pressure. It is a main feature of the weather at sea in middle latitudes where it is responsible for most of the occasions of strong winds and unsettled weather, though not all depressions are accompanied by strong winds.

Lows vary very much in size and depth ; one may be only a hundred miles in diameter and another over two thousand miles ; some are deeper than others, a deep low being one in which the pressure is very much lower near the centre than on the outside whereas, on the other hand, a shallow depression is one where the pressure, although low near the centre, is not very much lower than in the surrounding districts.

Note.—The bracketed equivalents hereunder refer to the Southern Hemisphere.

In the northern (southern) hemisphere the winds blow round an area of low pressure in an anti-clockwise (clockwise) direction ; there is also a slight inclination across the isobars towards the lower pressure. Thus the well-known rule for the northern (southern) hemisphere is that when an observer faces the wind the direction of the lowest pressure is from 8 to 12 points to his right (left). The strength of the wind is in all instances closely related to the steepness of the barometric gradient or distance apart of the isobars ; the closer the isobars the stronger the wind.

Lows may move in almost any direction, though most often towards north-east (south-east) or east, at a speed of anything between 10 and 40 knots, though occasionally as much as 60, during the middle and most active stage of their existence ; they slow down when filling up (see " occlusion " below). The life of a low is in the region of 4 to 6 days.

There are usually one or more fronts, probably radiating from the centre, in the area covered by a low ; each front on a synoptic chart represents a belt of relatively bad weather, accompanied by a veer (backing) of wind, which marks the change from the weather characteristic of one air mass to that of another. During the first two or three days of its life a low has a warm and a cold front, the area between the two being known as a warm sector because the air has come from a warmer locality than that which is outside the sector (see Fig. 1a). Warm air is lighter than cold air and it rises over the cold air ahead of the warm front, as shown in Fig. 1b ; this causes condensation of the water vapour in the warm air, forming at first cloud and later drizzle or continuous steady rain. The cloud spreads out ahead of the warm front, and the highest cloud, cirrus or mares' tails, is often about 500 miles ahead. At the rear boundary of the warm sector, known as the " cold front," the cold air is pushing under the warm air forcing the latter to ascend rapidly ; this process is sometimes violent enough to produce squalls. The rapid ascent of the warm air causes the moisture to condense in the form of cumulonimbus clouds (shower clouds), from which heavy showers may fall. The cold front gradually overtakes the warm front so that the warm sector is eventually lifted up from the earth's surface. When this has occurred the low is said to be occluded, and the warm and cold fronts have merged into the third type of front known as an " occlusion " (see Figs. 2a and b). When a low has become occluded, it usually decreases in intensity and rate of travel, and gradually fills up. On the other hand, a low which has a marked warm sector is likely to be deepening, the winds associated with it may increase in force and its rate of travel may increase. Lows are usually travelling in a direction approximately parallel to the isobars (and in the direction of the wind) in the warm sector.

The approach of a low is indicated by a falling barometer. In the northern (southern) hemisphere, if the low is approaching from west-

ward and passing northward (southward) of the ship, clouds appear on the western horizon, the wind shifts to a south-westerly (north-westerly) or southerly (northerly) direction and freshens, the cloud layer gradually lowers, and finally drizzle, rain or snow begins. If
5 the low is not occluded, after a period of continuous rain or snow there is a veer (backing) of wind at the warm front, a rise of temperature and diminution or cessation of rain (or snow) in the warm sector, the visibility being usually moderate and the sky overcast with low cloud. The passage of the cold front is marked by the approach from
10 westward of a thick bank of cloud (which however cannot often be seen because of the customary low overcast sky in the warm sector), a further veer (backing) of wind to west or north-west (south-west), sometimes with a sudden squall, rising pressure, a fall of temperature, squally showers of rain, hail or snow, and improved visibility (except
15 during showers). The squally showery weather with a further veer (backing) of wind and drop in temperature may recur while the low recedes owing to the passage of another cold front or occlusion. If the low is occluded, the occlusion is preceded by the cloud of the warm front ; there may be a period of continuous rain mainly in front of and
20 at the line of occlusion, or a shorter period of heavy rain mainly behind the occlusion, according as the air in front of the occlusion is colder or warmer than that behind it. There may be a sudden veer (backing) of wind at the occlusion.

Often another low follows 12 to 24 hours later, in which event the
25 barometer begins to fall again and the wind backs towards south-west (north-west), or even south (north).

If a low travelling eastward or north-eastward (south-eastward) is passing southward (northward) of the ship, the winds in front of it are easterly and they back (veer) through north-east (south-east) to
30 north (south) or north-west (south-west) ; changes of direction are not likely to be so sudden as on the southern (northern) side of the low. In the rain area there is often a long period of continuous rain and unpleasant thick weather with low cloud. In winter in the colder regions the weather is cold and raw and precipitation is often in the
35 form of snow.

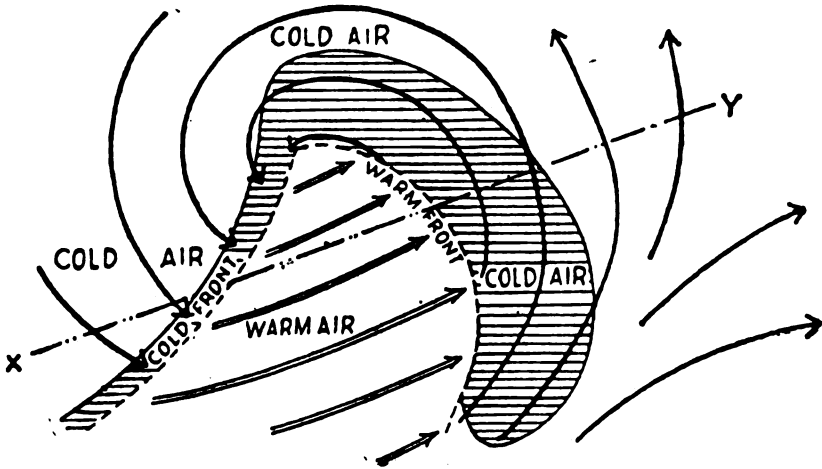
Near the region of lowest pressure, lulls are sometimes experienced, but sudden changes are likely, and in a deep low the wind may increase in strength very rapidly, perhaps to gale force as the barometer begins to rise.

Sometimes in the air circulation of a large low, usually on the
40 equatorial side and often on a cold front, a secondary depression develops, travelling in the same direction as the primary but usually more rapidly. The secondary often deepens while the original low decreases in intensity. In the region between the primary and the
45 secondary depressions, the winds are not as a rule strong ; but on the further side of the secondary, usually the southern (northern) side, winds are likely to be strong and they may reach gale force. Thus the development of a secondary may cause gales at a greater distance from the primary than anticipated, while there may be only light
50 winds where gales were expected.

The above is a brief general description of lows and the associated weather in temperate or middle latitudes of the northern (southern) hemisphere. It must be emphasised, however, that individual lows in different localities differ considerably from one another, according
55 to the characteristics (especially the temperature and humidity) of the

NORTHERN HEMISPHERE

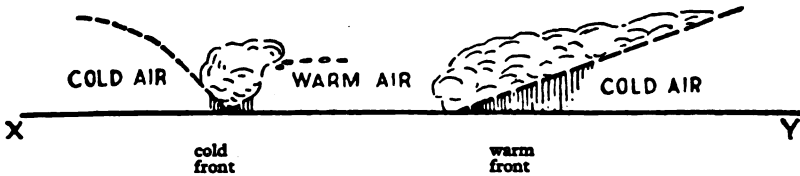
FIG. 1A



Plan of a developed depression

The double lines show the flow of the warm air, and the single lines the flow of the cold air
 The shading shows the areas where rain (or snow) is most probable
 Width of rain belt ahead of warm front is generally between 100 and 200 miles

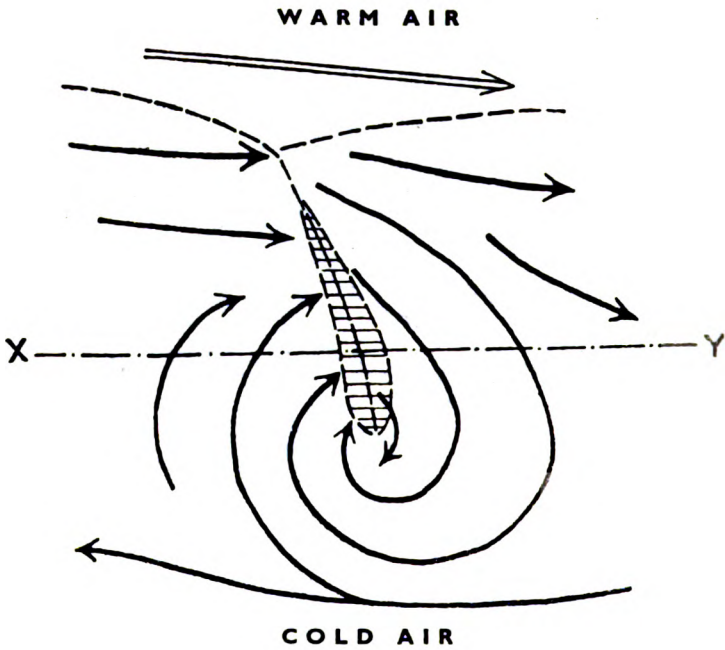
FIG. 1B



Vertical section of the depression along the line XY

[See over page

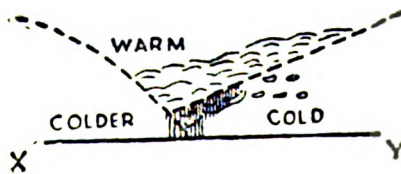
FIG. 2A



Plan of an occluded depression

The shading shows where rain (or snow) may be expected near the occlusion

FIG. 2B

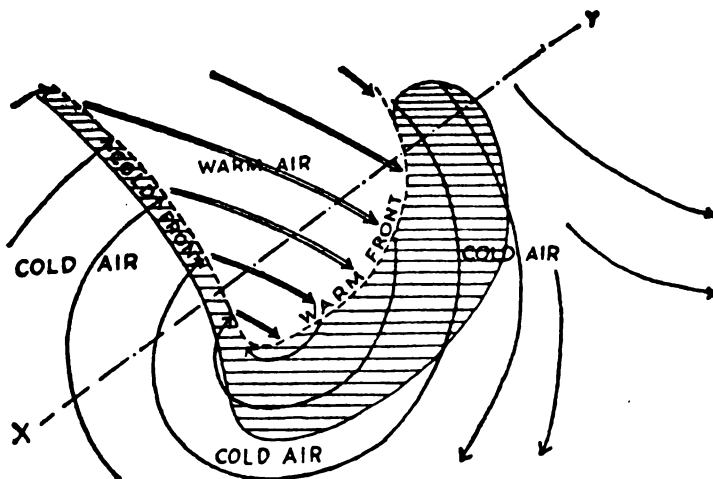


Vertical section of an occlusion of the cold front type

The air in front of the occlusion is warmer than the air behind it

SOUTHERN HEMISPHERE

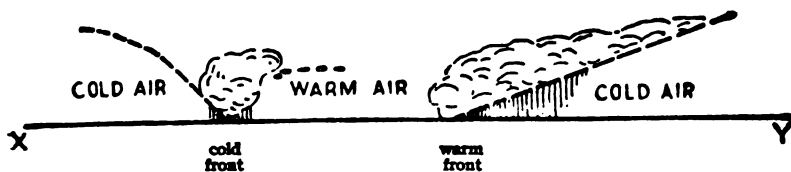
FIG. 1A



Plan of a developed depression.

The double lines show the flow of the warm air, and the single lines the flow of the cold air.
 The shading shows the area where rain (or snow) is most probable.
 Width of rain belt ahead of warm front is generally between 100 and 200 miles.

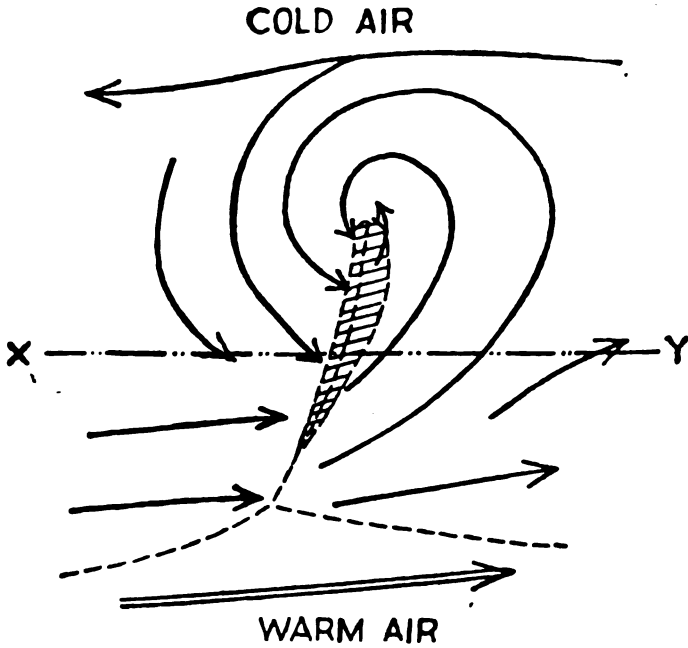
FIG. 1B



Vertical section of the depression along the line XY.

[See over page.]

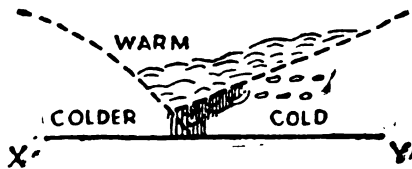
FIG. 2A



Plan of an occluded depression

The shading shows the region where rain (or snow) may be expected near the occlusion

FIG. 2B



Vertical section of an occlusion of the cold front type

The air in front of the occlusion is warmer than the air behind it

air currents of which they are composed, and the nature of the surface over which they are travelling.

(2) **Tropical revolving storms.**—*Practical rules for avoiding them.*—

These storms are so named because the wind blows round an area in which the lowest pressure is at the centre. The direction of rotation is anti-clockwise in the northern hemisphere and clockwise in the southern hemisphere. The wind does not revolve round the centre of low pressure in concentric circles but has a spiral movement inwards, towards the centre of the storm field. 5

A tropical storm is not so extensive as the depression of higher latitudes but, within 75 miles or so of the centre, the wind is often far more violent, and the high and confused seas near the centre may cause considerable damage to large and well-found ships, while small vessels (for example, destroyers) have foundered. The danger is still greater when ships are caught in restricted waters without adequate room to manœuvre. Within 5 to 10 miles of the centre the wind is light or moderate and variable, the sky is clear, or partially so, and there is a heavy, sometimes mountainous, confused swell; this area is known as the "eye" of the storm. After passing through the relatively windless centre of the storm the wind will suddenly, and with great violence, commence to blow from a direction almost opposite to that experienced on the other side of the windless centre. Due to torrential rain and sheets of almost continuous spray, visibility near the storm centre (but outside the "eye") is almost nil. 10 15 20

Every ship navigating in an area subject to tropical storms during the season of their occurrence should be constantly on the alert for any sign of their approach, so that steps can be taken to avoid the danger zone while there is still time and sea-room. 25

Localities, season, and average frequency.—Tropical storms occur for the most part on the western side of the oceans, though they are also experienced in the Bay of Bengal, off the north-west coast of Australia, and off the west coast of Central America. They are unknown in the South Atlantic. They are given various names according to the part of the world in which they occur. 30

Western North Atlantic	}—hurricanes	35
Eastern North Pacific		
South Pacific		
Western North Pacific	- typhoons	
Indian Ocean	}—cyclones	40
Bay of Bengal		
Arabian Sea		
North-west Australia	-willy-willies	

They are most frequent during the late summer and early autumn of their hemisphere; they are comparatively rare in the southern hemisphere from mid-May to November, and in the northern hemisphere from mid-November to mid-June. In the Arabian Sea, however, storms are most likely to occur at the change of the monsoon, i.e., October–November and May–June, though they average only one or two a year. Out-of-season storms occur from time to time, particularly in the western North Pacific where no month is entirely safe, and in the Indian Ocean where one is reported south of the Equator perhaps once in two years outside the usual season. The following table shows approximately the average number of severe tropical storms recorded per annum, from statistics taken over several years for the various areas :— 50 55

	West Indies	5
	Western North Pacific	25
	" South Pacific	3
	Southern Indian Ocean	6
5	Bay of Bengal	2
	Arabian Sea	1
	Eastern North Pacific	3
	West Coast of Australia	1

Variations in any one year amounting to 50% above or below the 10 average are not unusual. Some of the figures quoted are probably an underestimate since in the less-frequented parts of the world many storms must escape detection.

Origin, movement and extent.—Tropical storms originate as a general rule in the doldrums, between the parallels of 7° and 15° of latitude ; 15 those which affect the western part of the Pacific, South Indian and North Atlantic Oceans are first reported in the western third of those oceans, though there are exceptions, such as in the North Atlantic during August and September where an occasional storm is known to begin near the Cape Verde islands. In the northern hemisphere they 20 move off in a direction between 275° and 350°, though most often within 30° of due west. When in a latitude of 25° or so they usually recurve away from the equator and, by the time they have reached the 30th parallel, the track (or path as it is more usually called) is north-easterly. In the southern hemisphere they move off in a WSW. 25 to SSW. direction (usually the former), recurve at about 15° to 20°S., and thereafter adopt a south-easterly path. In either hemisphere many storms do not recurve but continue in a west-north-westerly (or west-south-westerly) direction until they reach the mainland where they quickly die.

30 The speed of advance of these storms is usually about 10 knots in their early stages, increasing a little with latitude ; it seldom exceeds 15 knots before recurving, but after recurving 20 to 25 knots is usual, though speeds of 40 knots or even more have been known.

Occasionally storms move erratically, the path turning towards 35 the equator, or adopting an easterly component in a low latitude, or even making a complete loop, but on these occasions their speed of advance is low, usually less than 10 knots, while the unusual path is being followed.

The extent of the storm area varies considerably with individual 40 storms but, generally speaking, winds of force 7 or more are improbable at more than 200 miles (especially on the equatorial side of the storm area) and force 8 is unlikely to be exceeded at more than 100 miles, from the storm centre, if in a latitude of less than 20°. Thereafter the radius increases with latitude so that these distances are 45 nearly doubled on reaching the 35th parallel, but the intensity diminishes near the centre. Hurricane force winds are likely within 75 miles of the storm centre in the tropics, and gusts exceeding 150 knots have been reported in a few instances within 50 miles or so (except in the eye of the storm). The aim of the mariner should therefore be to 50 remain as far as possible from the centre of the storm system.

Warning of existence or approach.—In most instances, warning of the position, intensity and probable movement of a storm is given by radio at frequent intervals by meteorological authorities ashore. (See Admiralty List of Radio Signals, Volume III.) Sometimes, however, 55 there is insufficient evidence available for an accurate warning or even a general warning to be given and ships must then be guided by their

own observations. Of the following indications of the proximity of a tropical storm, the first is by far the most reliable within 20° or so of the equator ; it should be borne in mind, however, that very little warning may be expected of the approach of an intense storm of unusually small diameter. 5

(a) If the corrected barometer reading is 3 mb. or more below the mean for the time of year, as shown in a climatic atlas or on the appropriate chartlets in the meteorological text of this Pilot, suspicion should be aroused and action taken to meet any development, such as raising steam in any available additional boilers, &c. 10 It should be noted, however, that the barometer reading must be corrected not only for height, latitude, temperature and index error (if mercurial), or for height and index error if aneroid, but also for diurnal variation, the amount of which is given for each hour of the day in the Air Ministry climatic atlases and in the meteorological 15 text of this Pilot. If the reading thus corrected is 5 mb. or more below normal, it is time to take avoiding action for there can be little doubt that a tropical storm is in the vicinity. According to an analysis of observations in the Western Pacific the centre of the storm is then probably not more than 200 miles away. At this 20 distance, at any rate in the China Sea vicinity, the wind has usually increased to about force 6.

When proceeding through an area liable to be visited by these storms it is desirable to take hourly readings of the barometer.

(b) An appreciable change in the direction and/or strength of the 25 wind.

(c) A swell is sometimes evident, proceeding from a direction that approximates to the bearing of the centre. If ahead of the storm this indication may be apparent before the barometer begins to fall.

(d) Extensive cirrus cloud followed, as the storm becomes closer, 30 by much alto-stratus cloud and subsequently fracto-cumulus or "scud."

(e) In addition there is the warning that can be given by radar. The existence of moderate or heavy rain can usually, under favourable meteorological conditions, be detected at the extreme range of 35 centrimetric radar, such as is normally used for navigational purposes afloat, depending on the vertical extent of the rainfall. Sub-refraction might decrease and superrefraction increase this range as with any other target. Although moderate or heavy rain does not fall symmetrically all round a storm, it is continuous for at least 50 40 miles in a broad sector extending from the "eye" of the storm where there is a circular area of relatively light winds and clear or partially clear sky. By the time radar evidence of the exact position of the storm is available, the ship will probably be already in fairly high seas and experiencing winds of force 9 or 10. There 45 should still be time, however, for her to avoid the centre of the storm.

Note.—In accordance with Article 35 of the International Convention for Safety of Life at Sea, it is the duty of every ship who suspects the presence or formation of a tropical revolving storm immediately to inform other vessels and shore authorities with all the 50 means at her disposal. Weather reports should be made by radio at frequent intervals giving as much information as possible, especially corrected (*not* for diurnal variation as in (a) above) barometer readings. If barometer readings are uncorrected this fact should be stated 55 in the signal.

Information required by the seaman before deciding upon action to be taken.—To decide on the best course of action if a storm is suspected to be in the vicinity, the mariner requires to know :—

- (a) the bearing of the centre of the storm ;
- 5 (b) the semicircle in which the ship is situated ;
- (c) the path of the storm.

If an observer faces the wind, the centre of the storm will be from 9 to 11 points on his right-hand side in the northern hemisphere when the storm is about 200 miles away, i.e., when the barometer has fallen
10 about 5 millibars and the wind has increased to force 6 or thereabouts; as a rule the nearer one is to the centre the more nearly does the angular displacement of the wind approach 8 points. A further check on the bearing of the centre may often be obtained by noting the direction from which the swell is coming. The swell travels approxi-
15 mately directly outward from the storm centre.

The semicircle in which the ship is situated can be determined by taking two such bearings with an interval of from two to three hours between observations, provided that allowance is made for the ship's movement. It can be assumed that the storm is not travelling towards
20 the equator ; and, if in a lower latitude than 20°, its path is most unlikely to have an easterly component ; and, on the rare occasions when neither of these statements applies, the storm is moving very slowly. (Exceptions to this are most likely in the South Pacific, where occasional storms often move off on a course almost due south, devel-
25 oping an easterly component at a latitude of about 15°, and in the western North Pacific where some of the out-of-season storms may recurve at an early stage.)

In a moving ship associated with a storm progressing at an unknown rate, it is very difficult to estimate from an apparent shift of wind the
30 direction and speed of the storm's motion relative to the ship. The surest method of ascertaining the true shift of wind and thereby finding out in which semicircle the vessel is situated, *is to stop the ship during the period between the two bearings*. If in either hemisphere, these observations show that the wind is veering, the ship is in the right-
35 hand semicircle ; if the wind is backing she is in the left-hand semicircle ; and if the wind remains steady in direction then the vessel is in the direct path of the storm, which is the most dangerous place of all.

The diagram headed " Typical Paths of Tropical Storms " (at the end of this article) illustrates the terms " dangerous semicircle " and
40 " navigable semicircle." The former lies on the side of the path towards the usual direction of recurvature, i.e., the right-hand semicircle in the northern and the left-hand semicircle in the southern hemisphere. It is so called because a sailing or low-powered vessel caught in it may be blown towards the path along which the storm
45 will pass, or the storm may recurve and the centre pass over her. The navigable semicircle is that which lies on the other side of the path. A ship situated within this semicircle will tend to be blown away from the storm centre, and the recurvature of the storm will increase her distance from the centre.

50 *Practical rules for avoiding tropical storms.*—In whatever situation a ship may find herself, the matter of vital importance is to avoid passing within 50 miles or so of the centre of the storm ; it is preferable to keep outside a radius of 200 miles or more, because at this distance the wind does not often exceed force 7 (and is generally not more than
55 force 6), and freedom of manœuvre is maintained. If a ship has at least 20 knots at her disposal, and shapes a course that will take her

most rapidly away from the storm before the wind has increased above the point at which her movement becomes restricted, it is seldom that she will come to any harm.

Sometimes a tropical storm moves so slowly that a vessel, if ahead of it, can easily outpace it or, if astern of it, can overtake it. Since, however, she is unlikely to feel seriously the effects of a storm so long as the barometer does not fall more than 5 mb. (corrected for diurnal variation) below the normal, it is recommended that frequent readings should be made if the presence of a storm in the vicinity is suspected or known, and that the vessel should continue on her course until the barometer has fallen 5 mb., or the wind has increased to force 6 when the barometer has fallen at least 3 mb. If and when either of these events occurs, she should act as recommended in the following paragraphs, until the barometer has risen above the limit just given, and the wind has decreased below force 6. Should it be certain, however, that the vessel is behind the storm, or in the navigable semicircle, it will evidently be sufficient to alter course away from the centre.

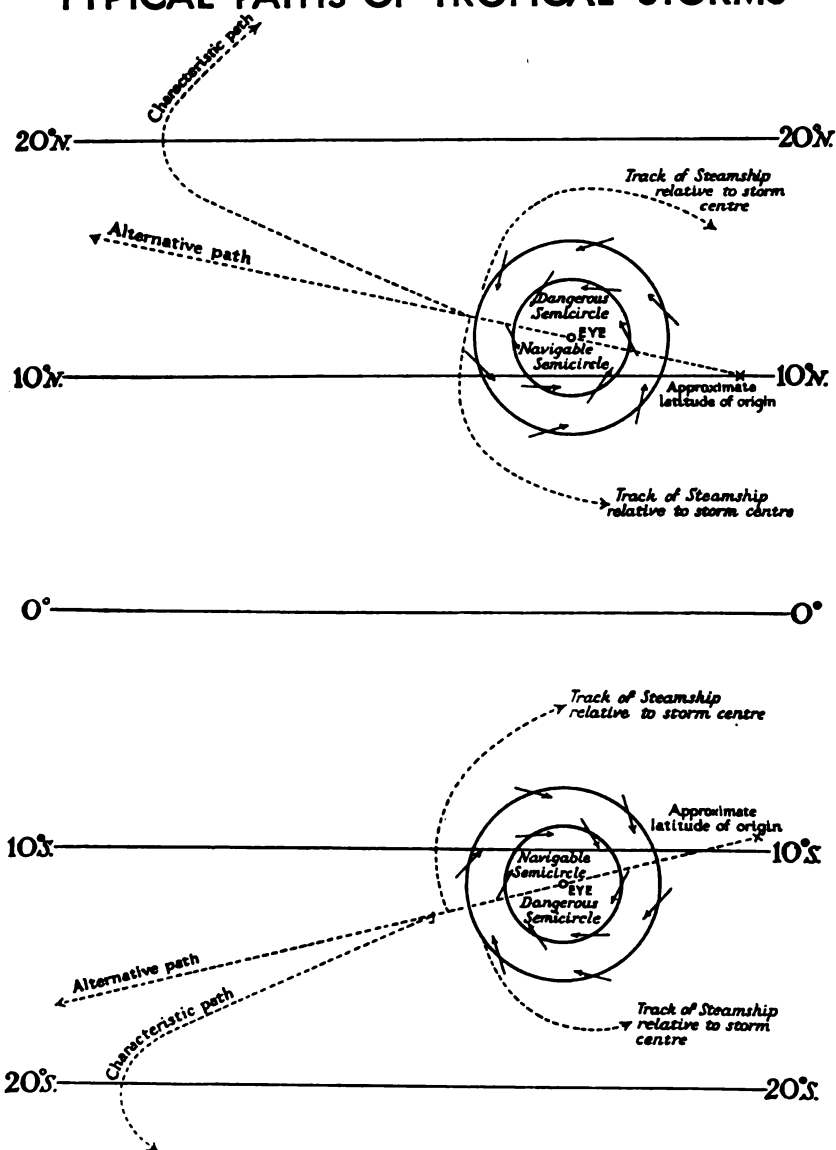
In the northern hemisphere.—(a) If the wind is veering, the ship must be in the dangerous semicircle. A power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed) on the starboard bow, and should subsequently haul round to starboard as the wind veers, thereby tracing a course relative to the storm as shown by the pecked line in the diagram. If a power vessel has insufficient room to make much headway when in the dangerous semicircle she should heave to in the most comfortable position relative to the wind, preferably with the wind on her starboard bow so that she is heading away from the centre of the storm.

(b) If the wind remains steady in direction, or if it backs, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path, particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a power vessel should bring the wind well on the starboard quarter and proceed with all available speed, subsequently altering course to port as the wind backs, thus tracing a course relative to the storm as shown by the pecked line in the diagram.

In the southern hemisphere.—(a) If the wind is backing, the ship must be in the dangerous semicircle. A power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed) on the port bow, and should subsequently haul round to port as the wind backs, thereby tracing a course relative to the storm, as shown by the pecked line in the diagram. If a power vessel has insufficient room to make such headway she should heave-to in the most comfortable position relative to the wind, preferably with the wind on her port bow so that she is heading away from the centre of the storm.

(b) If the wind remains steady in direction, or if it veers, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path, particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a power vessel should bring the wind well on the port quarter and proceed with all available speed, subsequently altering

TYPICAL PATHS OF TROPICAL STORMS



Note.—In this diagram the isobars are shown as concentric circles about the eye; in practice this is usually the case within 150 miles or so of the centre. Outside this distance the isobaric form often loses its symmetry and strong winds often extend farther on the polar side than on the equatorial.

course to starboard as the wind veers, thus tracing a course relative to the storm, as shown by the pecked line in the diagram.

If there is insufficient room to run when in the navigable semicircle, and it is not practicable to seek a safe and effective shelter before the storm begins to be felt, a vessel should heave-to in the most comfortable position relative to the wind and sea, bearing in mind the proximity of land.

If a ship finds that she is in the direct path of the storm and has no room to run into the navigable semicircle as directed above, it should be considered, bearing in mind possible recurvature, whether she should endeavour to make her way into the "dangerous" semicircle (where she may at least be better off than remaining in the direct path of the storm) and continue to steam to windward as fast as she can so as to get as far as possible from the centre.

If in harbour, or at anchor, a seaman should be just as careful as at sea in watching the shifting of the wind and estimating the movement of the storm relative to himself, so that he may consider shifting his berth with advantage or otherwise act according to circumstances. It is usually preferable, however, to put to sea if this can be done in sufficient time to avoid the worst of the storm. Riding out a tropical storm, the centre of which passes within 50 miles or so, in a harbour or anchorage, even if some shelter is offered, is an extremely unpleasant and hazardous experience, especially if there are other ships in company. Even if berthed alongside, or with special moorings and long bridles in use, a ship cannot feel entirely secure.

Discretion must, of course, be used. In the case of a low-powered or small vessel with, for example, insufficient warning to enable her to gain sufficient distance from the storm by putting out to sea, it will be preferable to remain in a reasonably sheltered harbour. If at sea and warning of an approaching storm is given and there is considered to be insufficient time or sea room to avoid the dangerous part of the storm area, it may be advisable for vessels of this type to seek shelter. In the China Sea, for example, there are so-called typhoon harbours which are listed in the Admiralty Pilot. In all cases, however, the mariner must use seamanship and initiative.

(3) **Local modification of the weather near the coast.**—The information given in Chapter I on climate and weather in the area covered by the Pilot refers necessarily to the coastal and sea regions generally but cannot attempt to deal with the local effects on the wind and weather of each separate headland, bay, or creek. The following notes, however, should prove helpful in showing how the weather in the general vicinity is likely to be modified by the topography or shape of the land close to the actual place in which the mariner is concerned.

- (i) If the coastline is steep-to, onshore winds that approach it at an angle are usually deflected nearly along the shore and increased somewhat in speed. And when the wind approaches a strait whose direction is somewhat similar to that of the wind, the wind tends to blow along the strait and increases in speed as the strait narrows.

When a strong wind blows directly towards a very steep coast, there is usually a narrow belt of contrary gusty winds close to the coast.

- (ii) Similarly, when the wind blows onshore towards the entrance to a wide estuary, especially one with hills on both sides, it generally tends to blow up the estuary. This effect is most

marked in the afternoon but there is often no such tendency during the night and early morning.

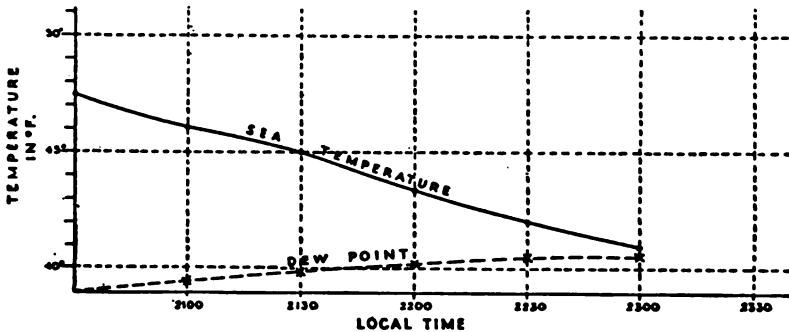
- (iii) An offshore wind is often squally on the lee side of hilly coasts, especially when the air is much colder than the sea, as for example when it blows off snow-covered land and when the wind over the open sea is force 5 or more.
- (iv) Near headlands or islands with steep cliffs there may be large changes in direction (up to about 90°) and speed of the wind in addition to those mentioned above.
- (v) During quiet and warm weather with clear or fairly clear skies, a sea breeze is of common occurrence during the warmer part of the day ; it is especially frequent in the tropics and subtropics. It blows onshore from, on the average, 4 to 8 hours after sunrise until shortly before sunset, reaching its maximum development during the afternoon (1300 to 1600) ; if there is an appreciable regional or general wind, then this will be modified by the onshore sea breeze. Under particularly favourable circumstances, such as high dry temperatures, relatively cool sea, and hilly background to coast, the sea breeze may blow as much as force 4 (occasionally 5) and extend 20 miles or more to seaward from the shore. At night, under similar circumstances, a lighter breeze blows from the land to the sea ; it seldom extends more than 5 miles from the shore nor does it become appreciable much before 2200 local time ; under favourable conditions, as in the tropics, it usually lasts until an hour or so after sunrise.
- (vi) When sea fog that is caused by the passage of warm air over a colder sea surface is general over the open sea, visibility is better close to leeward of a hilly island or promontory than to windward. This effect is most marked in late spring and summer, during the early afternoon when the land is at its warmest, and then applies to low-lying land as well.
- (vii) Radiation fog which forms over land on quiet nights with clear skies, mainly in autumn and winter, and sometimes spreads a few miles out to sea, is least thick during the afternoon and is often worst during the first hour or two after sunrise.

(4) **Forecasting sea fog.**—The most frequent type of fog in the open sea is that caused by relatively warm air flowing over a colder sea. Warning of this type of fog may be obtained by frequent observations of air and sea surface temperatures ; if the sea temperature falls below the dewpoint of the air, fog is almost a certainty. The following procedure is recommended whenever the temperature of the air is higher than, or about equal to, that of the sea, especially at night when approaching fog cannot be seen until shortly before entering it.

Sea and air (both dry and wet bulb) temperatures should be observed at intervals of about 5 miles and the sea temperature plotted against dewpoint. The dewpoint is obtainable from tables published in various text-books, but at temperatures up to about 60°F. a close enough approximation may be obtained by assuming it to be the same amount below the wet-bulb temperature as the latter is below the dry-bulb temperature ; for example, if the dry bulb reads 50°F. and the wet bulb 48°, the dewpoint is about 46°. If the curves of sea temperature and dewpoint converge, fog may be expected by the time at which they coincide.

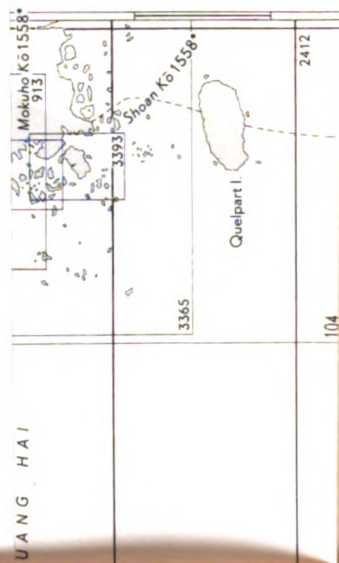
The figure on this page represents conditions that might be found by a low-powered ship in about long. 40°W. proceeding westward on the appropriate lane route for Halifax, Nova Scotia. At 2200 it would become evident that there is a probability of running into fog in about an hour's time, assuming that the sea temperature continues to fall at about the same rate that it has done during the last 1½ hours. 5

From the appropriate chart of average sea surface temperatures it can be seen where a rapid fall of temperature may be expected, so that if the dewpoint is within 5° or so of the sea temperature when 10 approaching the colder water zone, this will also give a fairly reliable warning of fog.



If it is desirable and practicable to escape from fog, a ship should steer for warmer water which will again be evident from the charted isotherms. 15

Fog, or very poor visibility, at sea may also occur in snow or heavy rain, or in association with the passage of a warm front or occlusion, or, when within 20 miles or so of land, it may occur as a result of radiation fog extending from the land; in high latitudes in winter, sea smoke may be met near land, when very cold offshore winds are blowing, or near extensive ice. The method described above will not give warning of these fogs, of which frontal fogs, though common in middle latitudes, are neither so extensive nor so persistent in any one locality, and the other fogs mentioned are rarely encountered far from land (or extensive ice). 25



NOTE

The charts & plans shown on this Index represent
published at the date given at the foot.
They are liable to alteration and amendment.
The limits of the book are shown by the pecked
and tinted coast.

General Charts. ¹Hongkong to Gulf of Lioutung No.
China Sea No 1263



the charts & the date given at the foot
published at the date of alteration and amendment
They are liable to alteration and amendment
The limits of the book are shown by the pecked line
and tinted coast

Hongkong to Gulf of Liatung No. 1262
General Charts, China Sea No. 1263

IMPORTANT.

Details of Lights, Fog Signals, and Time Signals (visual) are not included in this volume ; for this information the Admiralty List of Lights, Vol. 6, should be consulted.

Information regarding Vertical Movement of the Water is not included ; for this the Admiralty Tide Tables should be consulted.

Details of Radio information (weather bulletins, storm and navigational warnings, time signals, fog signals, and D.F. stations) are not included ; for this information the Admiralty List of Radio Signals should be consulted.

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CHINA SEA PILOT

VOL. III

CHAPTER I

CAUTIONS—GENERAL INFORMATION—GENERAL DIRECTIONS—ICE—CURRENTS—TIDAL STREAMS—SIGNALS—BUOYAGE—PILOTAGE—LIFE-SAVING — AIR LIGHTS — REGULATIONS — SUBMARINE CABLES — MEASURED DISTANCE—LOCAL MAGNETIC ANOMALIES—COMMUNICATIONS—FUEL—REPAIRS—BRITISH CONSULAR OFFICERS—STANDARD TIME—CLIMATE AND WEATHER

CAUTIONS.—China.—The Communist Government of China does not observe the International practice of exchange of hydrographic information, and it is therefore no longer possible to ensure that Admiralty charts and publications, covering the coasts of the mainland of China and adjacent waters, are up to date for new dangers or changes in Navigational Aids and Warnings. 5

Mariners are therefore cautioned to exercise additional care when navigating in these waters.

Mined areas.—The waters around Korea are mined, and mariners should not enter them without first obtaining details of the mining situation and/or routes from Naval authorities at Yokohama, Sasebo or Kobe. 10

Fishing fleets.—Lights.—Enormous fleets of fishing junks may be met on the coast of China. As a rule the junks have their smallest sail forward; they are stoutly built, so that serious damage would probably be caused to an iron vessel in collision with one of them. 15

The large trading junks have five masts, with two small sails aft. Chinese junks do not carry the regulation lights.

GENERAL INFORMATION.—China.—China is composed of 32 provinces, which include the former Manchuria and the island of Formosa. The provinces on the seaboard are Kwangtung (Kuangtung), Fukien (Fuh-kien), Chekiang (Cheh-kiang), Kiangsu, Shantung, Hopeh (Hopei), Liaotung (Antung), and Liaosi (Liaoning). 20

During 1949, the Communists obtained full control over the mainland of China, and, in 1950, they extended their hold over most of the islands off the coast, including Hainan. The National Government, under Chiang Kai-shek, is in possession of Formosa and a few small island groups. 25

The "People's Republic of China" was proclaimed on 21st September, 1949, when Peking (Peiping) again became the capital after an interlude of from 1928 to 1949, when the capital was at Nanking.

5 The estimated population, in 1950, was 483,870,000.

Physical features.—The whole of China is compact, forming a great continuous area. Only one large peninsula juts out from the general outline of the coast. The irregularities of the coast, except in the great estuaries of Chu Chiang or Canton river, Hang-chou wan
10 (Hangchow bay), and Ch'ang Chiang or Yangtze Kiang, are comparatively small indentations. Southward of Hang-chou wan the inlets and small coastal islands are innumerable, forming many good harbours for junks, if not for ships; while northward of Hang-chou wan they are rare, except in Shan-tung pan-tao (peninsula), and
15 even there not many of them are convenient for shipping.

One of the most remarkable features of China is a great plain in the east, stretching southward from the mountains northward of Peking to the lower valley of Ch'ang Chiang, through about 8° of latitude, with a breadth of about 3° to 6° of longitude, and comprising also
20 the peninsula between the estuary of Ch'ang Chiang and Hang-chou wan. The only interruption to it, which is partial, consists in the mountainous area which juts out in Shan-tung pan-tao.

In all other parts of China mountains and other high land prevail.

The north of China is characterised by the prevalence of a yellow
25 earthy deposit of great fertility, named loess, which fills the valleys to a depth of thousands of feet and covers alike high and low grounds. It is apt to wear away in such a manner as to form terraced, vertical precipices, and being soft, is easily washed away from the banks of rivers, so that the rivers change their course frequently and their beds
30 are encumbered by shoals. Partly from this circumstance, few of the rivers in the north are navigable.

The mountain range northward of Peking extends eastward and approaches the shore of Liao-tung wan (Gulf of Liaotung) in about lat. 40° N. From Ying-k'ou (Yingkow), a magnificent plain stretches
35 north-eastward to the River Amur; on the west this plain is bounded by the gradually rising mountains of Mongolia; the eastern part of the plain is skirted by usually low mountain ranges, which succeed each other eastward to the Sea of Japan.

All the chief rivers of China have a general course from west to east;
40 these, with their tributaries and artificial canals, form the principal means of inland communication in China. Of the rivers, far the most important is Ch'ang Chiang; only the estuary and its lowest tributary, Huang-p'u Chiang (The Whangpoo), are dealt with in this volume; above the entrance to Huang-p'u Chiang, a detailed description
45 is given in the Yangtze Kiang Pilot.

Products, industries and trade.—China is essentially an agricultural country. Wheat, barley, maize, and millet, and other cereals, with peas and beans, are chiefly cultivated in the north; rice, sugar and indigo in the south. Cotton is grown widely as far northward as the
50 southern and central parts of Hopeh, the chief area of production being Ch'ang Chiang and Huang ho (Yellow river) valleys. Tea is cultivated exclusively in the west and south. Silk culture is one of the oldest industries of China. There is a considerable tobacco crop. Pigs are raised everywhere in China, and pig's bristles have become
55 an important article of export.

Most of the provinces of China contain coal, and China may be

regarded as one of the leading coal countries of the world. Gold, silver, copper, iron, zinc, tungsten, mercury, tin and lead also occur.

In antimony China produces a considerable proportion of the world's total production, of which the greatest quantity comes from the province of Hunan. Mining of wolfram is carried out in Hunan, Kwangtung and Yunnan; molybdenum has been found in Fukien and Kiangsi; bismuth has also been worked. Petroleum is being worked on the Upper Ch'ang chiang, and in Shensi. There were nearly 8,000 registered factories in China, in 1947.

The chief imports, in 1948, were raw cotton, liquid fuels, machinery, fertilizers, paper, dyes, paints and varnishes; chief exports were cotton piece-goods, tung oil, cotton yarn, bristles, sugar, wolfram and live pigs.

Currency.—Legal tender currency on the mainland of China is the Jen-min-piao or People's Bank dollar. The official exchange rate has to be adjusted frequently. The rate of exchange fixed in December, 1952, was £1=69,270 dollars.

Weights and measures.—Standards of weights and measures vary all over the country. Two kinds of standards are, however, generally in use, namely the old and the new. The law governing the new standard was promulgated on 6th February, 1929, and was intended to be the legal standard of weights and measures throughout China; this was based on the metric system and was adopted in the Customs service on 1st February, 1934. The old system is, however, still in use and is as follows:—

10 Ch'ien	= 1 Liang (tael)	= 37·301 grammes	
16 Liang	= 1 Chin (catty)	= 596·816 grammes	
100 Chin	= 1 Tan (picul)		
10 Sheng	= 1 Tou	= 10·354688 litres	30
10 Tau	= 1 Tan		
10 Fen	= 1 Ts'un (inch)		
10 Ts'un	= 1 Ch'ih (foot)	= 0·32 metre	
10 Ch'ih	= 1 Chang	= 3·2 metres	
100 Chang	= 1 Li	= 576 metres = $\frac{1}{2}$ mile.	35

The Ch'ih of 14 $\frac{1}{16}$ English inches has been adopted as the standard; the Tael, Catty and Picul have been fixed at 1 $\frac{1}{2}$ oz., 1 $\frac{1}{2}$ lb. and 133 $\frac{1}{2}$ lb. avoirdupois, respectively. 1 Mow = $\frac{1}{3}$ acre.

Health.—*Caution.*—Owing to the way the Chinese manure the fields and to the general disregard of sanitary precautions, water becomes polluted, and should never be used for drinking or cooking without being boiled.

Aerated waters sold by the natives, and ice stored by them, must not be used.

Dysentery, cholera, and milder forms of intestinal diseases are common in summer, and occur from drinking impure water, promiscuous use of raw vegetables, or from chills caught when lying on deck at night.

There is a peculiar form of intestinal catarrh, popularly known as spure, which attacks Europeans predisposed to illness; the mucous membrane is affected, diarrhoea is often profuse, and only fresh milk diet, and often hospital treatment, or removal from the country, can cure the patient.

Formosa.—Formosa or T'ai-wan includes the Pescadores and other adjacent islands. It was ceded to Japan in 1895, and returned to China after the Second World War in 1945. It is now controlled

by the Chinese National Government under Chiang Kai-shek. Formosa is divided into 5 provinces and 3 districts.

The population, in 1950, was 7,647,703, exclusive of troops. The native inhabitants are classified in two main races, the Han race and the aboriginal race; the former is again divided into those settlers from Fukien and those from Kwangtung, and they form about 93 per cent. of the native population. The aboriginal race, the original and oldest inhabitants of the island, are again divided into semi-civilised and savages, both being of Malay descent; the savages are sub-divided into seven tribes, although they are broadly classified as northern or southern aborigines, the latter being more peaceful and submissive than the former.

The Portuguese are believed to have visited Formosa earlier than 1550, but they do not appear to have made any permanent settlements there. The island was then inhabited by a collection of non-Mongolian tribes. The Dutch effected a settlement in the Pescadores in 1622, and removed to Formosa in 1624, but in 1662, Koslinga, the great opponent of the Manchu dynasty, captured Fort Zealandia, and drove the Dutch out of the island; several of his family reigned over Formosa until 1683, when the Manchus took possession of the island and made it a district of the province of Fukien, which it remained until ceded to Japan.

Physical features.—Formosa forms a link in the volcanic chain, which, commencing at New Guinea and running northward to the Kuril islands, constitutes the eastern escarpment of the former Malayo-Chinese continent; it is connected to the mainland of China by a submarine plateau, with general depths of less than 50 fathoms (91^m4), whilst the depths close up to the eastern coast of the island are considerable.

A chain of mountains runs through the centre of the island from north to south, dividing it into two watersheds north and south; the highest peak is Mount Morrison, known to the Japanese as Nītaka yama, 12,954 feet (3948^m4) high, situated nearly in the middle of the island. Eastward of this range the country is mountainous, and the cliffs on the eastern coast are the highest in the world, presenting in some places an almost sheer descent of over 4,000 feet (1,219^m2). Westward of the central range are graduating hills, which eventually descend to broad plains running from north to south, intersected by rivers and streams, and finally terminating at the coast in sandbanks and mud spits; a most remarkable feature of this side of the island is the rapidity with which the land is extending seaward.

There are no important rivers. The largest is Cho-shui ch'i (Dakusui kei), which enters the sea in the middle of the western side of the island by several small branches. Tung-chiang ch'i (Tōkō kei), the second largest river, flows in a southerly direction and enters the sea at Tung-chiang (Tōkō), on the south-western coast; although this river is broad, it is shallow and obstructed by sandbanks. The only lake, except for salt pans developed near the coast, is Jih-yüeh t'an, with a circumference of about 9 miles, situated in the centre of the island at an elevation of about 2,400 feet (731^m5).

Earthquakes are of frequent occurrence, and it is considered ominous when a long period elapses without a shock being felt; as a rule not much damage is done. There is a record of a severe shock in 1872, which is said to have effected a considerable change in the coast; a severe shock also occurred in 1862, and violent shocks in 1881, 1882 and 1892.

Products, industries and trade.—Agriculture is the principal industry.

The island is, in general, fertile ; rice, the principal agricultural product, sweet potatoes, and the sugar cane are cultivated almost everywhere. The principal fruit is the banana. The chief mineral products of Formosa are gold, silver, copper and coal.

The forest area of Formosa is extensive and the camphor tree flourishes. There are considerable manufacturing industries.

In 1952, the chief exports were sugar, rice, bananas and tea ; the chief imports were chemical fertilizers.

Currency.—Formosan currency is linked to the United States dollar, and is liable to fluctuation. In 1951, the rate of exchange was 15.55 yuan to one dollar.

Korea.—Korea, called Chōsen by the Japanese, lies between the parallels of 34° 18' N. and 43° N., and the meridians of 124° 36' E. and 130° 47' E. Only the western coast, which is bounded northward by Amnok kang or Yalu chiang (Ōryoku kō), is described in this work.

The earliest records of Korea date from about 1122 B.C., when Kitz with some 5,000 Chinese colonists took Chinese arts and politics to that country. The earliest European description of Korea was furnished by Hendrik Hamel, a Dutch seaman belonging to the *Hollandra*, a vessel of the Dutch East India Company which was wrecked on Quelpart island in 1653. In 1797, the eastern coast was examined by Captain Broughton, in H.M.S. *Providence*, and in 1816 the south-western coast was visited by Captains Maxwell and Basil Hall in H.M. Ships *Alceste* and *Lyra*.

In 1866 unsuccessful attempts were made by several European nations to conclude treaties with the country, and it was not until 1880 that the first one was made by Japan, this being followed by others concluded in 1882 by Great Britain and the United States, and shortly afterwards by France and Germany.

In August, 1910, Korea was annexed to Japan, and became a part of that empire, under the control of a Japanese Governor-General.

In 1945, the United States and U.S.S.R. forces enforced the surrender of the Japanese troops in Korea, dividing the country for mutual military convenience into two portions, separated by the 38th parallel of latitude. The country remained thus divided until the outbreak of the Korean war in June, 1950.

In 1946, the population of Korea was 27,700,000.

Physical features.—The peninsula may be described as a mountainous ridge, sloping towards the western coast, which is the outlet for the principal rivers and is deeply indented, with several harbours and anchorages, sheltered by the islands, but their value is somewhat impaired by the large rise and fall of tide, and the strength of the tidal streams.

The eastern coast, also mountainous, has only a narrow strip of cultivated plain separating it from a chain of lofty mountains, which, from the 40th parallel, extends in a continuous line to the extreme south, with here and there spurs stretching towards the western coast ; the harbours are few on this side, and the rise and fall of tide comparatively insignificant.

In the north is the lofty Hamgyōng Sanmaek range, and among the spurs extending from the eastern range westward are the Diamond mountains, so named by the Koreans from the resemblance of their serrated peaks to rough diamonds ; in the north the mountains

are thickly wooded, with deep valleys and gorges, but along the coast they are mostly bare, and covered with coarse bamboo grass, varied by scattered groves of stunted firs, generally from 4 to 5 feet (1^m2 to 1^m5) in height.

- 6 Streams occupy every gorge and valley, but large rivers are few, and owing to their short courses, strength of streams and shallowness, they are only navigable for small craft, and those on the eastern coast, on account of the proximity of the mountains, are only small. Korean rivers are usually known under different names at various parts of their courses.

10 *Fauna*.—Tigers, which exist almost everywhere, but especially in the mountains and forests of the north-eastern provinces, are noted for their size, boldness, and ferocity ; they are hunted by the Koreans in winter, when the snow renders them somewhat helpless, but in summer the position is reversed, and numbers of the inhabitants fall a prey to them.

Other wild animals are leopards, bears, deer, boars, otters, martens, squirrels, and sables ; domestic animals are horses, sheep, asses, mules, oxen, dogs, goats, and pigs.

- 20 The birds include eagles, hawks, pheasants, ducks, swans, geese, herons, cranes, snipe, rooks, storks, etc. Fish are abundant especially on the eastern and south-eastern coasts, and whales follow the large shoals of sardines and herrings that visit the coasts.

Products and industry.—Up to the time of the outbreak of the war in 1950, Korea was almost an entirely agricultural country, with a cultivated area of about 11,000,000 acres. The principal crops were rice, which formed about 27 per cent. of the cultivated area, barley, wheat, beans, and grain of all kinds, and the secondary crops tobacco and cotton.

- 30 Silkworm rearing was also carried on. Live-stock was raised as a by-product of agriculture, the cattle being well known for their size and quality. The fishing industry was greatly developed by the Japanese ; whale fishing was carried on off the coast.

Although Korea is highly mineralised, deposits are mostly small, with the exception of tungsten. Copper, iron and coal are fairly abundant ; alunite, lead, magnesite, zinc, cobalt, chromium, manganese and nickel are also found. The development of these resources has doubtless been impeded by the war but was formerly making steady progress. Graphite and mica are also found in fair quantities.

- 40 *Trade*.—The principal imports before the war were cotton goods, machinery, silk goods, timber, mineral oil, grass cloth, sugar, paper, flour, fertilisers, and coal ; the principal exports were rice, beans, hides, cattle, silk, cocoons, and gold ore. By far the greater part of the trade was with Japan.

45 *Currency*.—A unit called the hwan, equal to 100 won, was introduced in South Korea in 1953. 60 hwan is equal to one United States Military dollar.

GENERAL DIRECTIONS.—For information regarding ocean passages the mariner is referred to the Admiralty publication “ Ocean Passages for the World.” The usual routes taken by steam vessels proceeding between Hong Kong and Shang-hai are given hereafter.

- Vessels of low power should not attempt to proceed northward during the north-east monsoon or the typhoon season, except by the inshore passage, described on page 8. Good shelter during the north-east monsoon may be obtained at convenient distances along

the coast ; a list of such places will be found in Appendix IV. At all times during the north-east monsoon the weather is uncertain, and strong breezes set in without any warning, sometimes lasting two or three days, or even more. Fog is similarly experienced in the early parts of the year.

Large fleets of fishing junks may be met with off the coast of China, and they very often carry no lights ; *see* caution on page 1.

Charts 1962, 1760, 2412.

Hong Kong to Shang-hai.—When navigating along this part of the coast care is necessary at all times, as the tidal streams are very strong in places, especially in the vicinity of Nan-p'eng ch'ün-tao (Lamock islands), Hsia-men (Amoy), Wu-ch'iu hsü (Ockseu islands), Yin shan (Tung-yung), T'ai-chou lieh-tao (Taichow islands), Chou-shan ch'ün-tao (Chusan archipelago), and the approach to Ch'ang chiang.

From time to time vessels have stranded on out-lying islands on the coast of China between Fokai point and the entrance to Ch'ang chiang, and, in most cases, the stranding would not have occurred if attention had been paid to the necessity of constantly sounding in thick or misty weather. Many lighthouses on the islands are of considerable elevation, and often the upper parts of the islands and the lights are obscured by fog, so, as a general rule, if a light is not seen when a vessel is within its distance of visibility, she should sound at once, even if the weather is apparently quite clear, and proceed out to a safe depth, continuing sounding until the position is ascertained.

Except when northward-bound against a strong north-east monsoon, the route between Hong Kong and Shang-hai is as direct as safe navigation permits, keeping from 5 to 10 miles eastward of the outer islands. If northward-bound against a strong north-east monsoon, vessels should keep as close to the coast as safety permits until northward of Chou-shan ch'ün-tao.

Chart 1957.

In daylight and clear weather vessels can pass inside Nan-p'eng ch'ün-tao and Hsiung-ti tao (Brothers islets) ; at night it is advisable to pass outside them.

Charts 1760, 1761.

An indraught should be guarded against when passing Nan-mi-lo-fu (South Merope) with the north-going tidal stream ; owing to the irregular depths in this vicinity vessels of deep draught should always pass outside Tung-ting tao (Chapel island). When proceeding against the north-east monsoon vessels usually pass about $2\frac{1}{2}$ miles north-westward of Wu-ch'iu hsü ; thence passing fully three-quarters of a mile on either side of Niu shan (Turnabout island), and thence direct for Yin shan, avoiding Tung-sha. In the north-east monsoon there is a strong current setting south-westward between Niu shan and Yin shan, and it has been known to run at a rate of from 4 to 5 knots ; when approaching either of these islands from the northward, soundings give little or no indication of the vessel's position. There is an indraught into all the deep bights along this part of the coast during the north-going tidal stream.

Charts 1754, 1759, 1199.

From Yin shan (*Lat. 26° 23' N., Long. 120° 30' E.*) a course should be steered to pass eastward of T'ai-chou lieh-tao, passing outside all the islands lying between Yin shan and T'ai-chou lieh-tao, and thence steering to pass about 4 miles eastward of Tung-t'ing tao (Tongting), whence course should be altered northward for Hsiao-pan men

Charts 1754, 1759, 1199.

(Steep Island pass). After passing through Hsiao-pan men, the directions on page 380 should be followed.

Charts 1761, 1754.

- 5 Vessels of moderate draught can take an inshore route from Niu shan, steering northward from that island so as to pass eastward of Vereker rocks and the other dangers off the eastern coast of Hai-t'an tao (island), and passing westward of Pai-ch'uan lieh-tao, Ma-tsu shan (Matsu), and Kao-teng hsü (Pai sha), thence passing through
10 the channel between Chui shan (Cony island) and Ma-shih tao, and south-eastward of Pei-shuang lieh-tao and T'ai-shan lieh-tao (Piseang islands and Tai islands), and Hsing-tzu (Seven Stars), whence the route given above should be followed for Hsiao-pan men.

Chart 1199.

- 15 Tung-fu shan (Video) is an excellent landmark for vessels making for Hsiao-pan men, especially from southward. If, owing to thick weather, Hsiao-pan men cannot be used, vessels must pass eastward of Wai-shuai shan (Two Brothers) and Tung tao (Barren islets), giving these rocks and islets a wide berth, and it is then difficult to
20 obtain the vessel's position again.

Chart 1962.

Inshore passage.—Vessels with a draught of not more than 22 feet (6^m7) can take the inshore passage given hereafter, by which much of the heavy sea caused by the north-east monsoon is avoided.

- 25 Passing about half a mile southward of Fokai point a vessel should steer eastward for Che-lang chiao (Chilang point), passing northward of Pauk-piah and about one mile southward of Reef islets. Thence she should pass about 3 miles southward of Hsi-chieh chiao (Siki) and shape course towards Lien-hua-feng chiao (Breaker point), taking
30 care to give Chia-tzu chiao (Kupchi point) a wide berth to avoid the rocks lying off it. From Lien-hua-feng chiao the vessel should steer to pass about 2 miles south-westward of Hao-wang chiao (Good Hope cape), and thence steer north-eastward to pass northward of P'eng hsü (Plat islet) and between Three Chimney bluff, the south-eastern
35 extremity of Nan-ao tao (Namo island), and Pan-ch'ao chiao (Half-tide reef); thence southward of Hu hsü (Bell islet), and westward of Shih hsü and Hsiang hsü (Cliff and Square islets), to Ku-lei t'ou (Thunder head).

- A small vessel, from the position 2 miles south-eastward of Hao-wang chiao, can steer for Feng hsü (Brig island), passing eastward of
40 Wu-chiao-erh (Dove rock), and thence through the passage northward of Nan-ao tao, which has a least depth of 2½ fathoms (5^m0) in the fairway; thence pass northward of Liu-niu chiao (Dioyu reef) and between Hu hsü and Shih hsü as directed above.

- 45 *Chart 1760.*

- From Ku-lei t'ou the vessel should pass eastward of Rees rock and through Rees pass; thence pass north-westward of Gu, Flying Fish, and Ching rocks, about half a mile south-eastward of Ts'ao-hsieh (Hut) islet, which lies off Ta-yü chiao (Tagau point), and east-
50 ward of Baker rock, Pai-ya (Spire) islet, and Outer Cleft islet, thence giving K'ao-k'o chiao (Cork point) a berth of about one mile. A small vessel can also pass inside the islets and rocks which lie between Ta-yü chiao and K'ao-k'o chiao (*Lat. 24° 02' N., Long. 117° 54' E.*) by proceeding through Blakeney pass (page 114).

- 55 Thence she should proceed between House Hill point and the reef which extends north-westward from Nan-ting hsü (Lamtia islet),

Chart 1760.

passing south-eastward of Lin-yu hsü (Notch islet), between Chapman patch and Pei-mi-lo-fu (North Merope), and thence past Chen-hai chiao (Chinha point). The vessel should cross the entrance to Hsia-men chiang (Amoy harbour) and pass fully 2 miles south-eastward of Pei-ting tao (Dodd island) to avoid the $2\frac{1}{4}$ -fathom (4^m) patch which lies about $1\frac{1}{4}$ miles eastward of that island, and then steer so as to pass the coast near Shen-hu chiao (Chimmo point) at a distance of not less than one mile. Pei-ting hang-men (Dodd passage) (page 135), between Pei-ting tao and Chin-men tao (Quemoy island), can also be used.

After crossing the entrance to Shen-hu wan (Chimmo bay) the vessel should steer to pass fully one mile off Ta-tso chiao (Pyramid point) and Rogues point.

Chart 1761.

After passing Rogues point she should pass westward of Ta-tien (Sorrel rock), across the entrance to P'ing-hai wan (bay) and eastward of Ping rock. The vessel should then proceed through Nan-jih shui-tao (Lam Yit channel) (page 142), into Hsing hua shui-tao (Hunghwa channel) by the passage between Ta-she hsü (Passage islands) and Lu hsü (Wilshire island) as directed on page 146, and through Hai-t'an hsia (strait), which should be entered by the South entrance (page 149). After passing through Hai-t'an hsia she should steer to pass south-eastward of Ta-lao shan (Tessara islands) and about one mile eastward of Chi-hsing chiao (Outer Min reef), and thence between Chih-chu tao (Spider island) and Chui shan.

Another route, instead of proceeding through Nan-jih shui-tao and Hai-t'an hsia, can be taken by passing between the north-western island of Wu-ch'iu hsü and Lu-tz'u shü (Loutz island), giving the latter a berth of about 4 miles; thence pass about 3 miles southward of South Yit, Scattered Yits, and Sheng-t'u-li tao (Sedan rock). When the eastern extremity of Hulu tao (Kwing island) bears about 013° , and is open eastward of Lao-ch'ing-wa lieh-tao (Lochinvar islets), the vessel should steer northward so as to pass inside Niu shan (Lat. $25^\circ 26' N.$, Long. $119^\circ 56' E.$), guarding against being set on to South reef and Hai-t'an shoal, and thence pass about 4 miles eastward of Hulu tao, so as to avoid Vereker rocks. She should continue northward, passing eastward of Bassett rock, to a position about one mile eastward of Chi-hsing chiao, whence proceed as previously directed.

Chart 1754.

The route then runs through Hsiao-an shui-tao (Seacon channel), passing between Chih-chu tao and Shuang-feng tao (Double Peak island). Thence the vessel should proceed eastward of Fu-yao shan (Fu-yan) and westward of Ying -ko-ku lieh-tao (Incog islands), and steer direct for Tung-kua hsü (yu), passing eastward of Lo-ying shan (Pingfong island) and Pai-mou chiao (Farmer rock), and about 4 miles westward of Shan-ma-an (Turret islet).

Chart 1763.

Pass between Tung-kua hsü and Pei-lung shan, and thence proceed through Hei-niu wan, leaving it by Tung-pei men, the eastern passage (page 271); then proceed between Ta-chu shan (Ta-chih yu) and Tung t'ou shan, taking care to avoid Ching chiao and the other dangers off the eastern side of the latter island. At night, the vessel should pass well clear southward of Ta-chu shan and eastward of Hu-tou hsü (yu). A small vessel, instead of passing through Hei-niu

Chart 1763.

wan, can proceed through Tung-t'ou hsia (strait) (page 272), in which there is a least depth of 11 feet (3^m4).

Chart 1759.

- 5 Thence the vessel should pass between Ta-lu shan (Taluk) and Ch'ien shan, the northernmost of the three Seoluk islands, holding the Ta-lu shan side of this channel; thence pass between Flare islet and T'ung-chen (Sugarloaf) and south-eastward of the south-eastern of the two islets lying south-eastward of San-suan shan (San-shi), and
10 south-eastward of the Stragglers and Lo hsü (Soudan island). A small vessel with local knowledge can pass westward of San-suan shan, the islet about one mile northward of it, and Niu shan (Shetung).
Charts 1763, 1754, 1759.

- Instead of passing westward of Tung-kua hsü a vessel can, after
15 passing Shan-ma-an, pass northward of Nan-chi shan (Nam-ki), southward and eastward of Pei-chi (Pi-ki) shan, eastward of Hu-tou hsü, and thence about 2 miles eastward of Lo hsü. Or pass about 1½ miles eastward of Tung-kua hsü and then proceed northward of Pei-hsing by keeping Tung-kua hsü bearing 246° astern.

Chart 1759.

- After passing Lo hsü the vessel should steer to pass fully one mile eastward of Chiku shan (*Lat. 28° 23' N., Long. 121° 43' E.*), and then steer north-north-eastward to pass about 2 miles eastward of Pai-chia shan (Crate island) and Tung-chi (Tung-chu), and about
25 the same distance eastward of T'an-t'ou shan (Tan-tau san). Thence she should proceed through Niu-pi-shan shui-tao (Nu-pi-shan channel) (page 296), and through the inshore passage westward of Chou-shan ch'ün-tao (page 318).

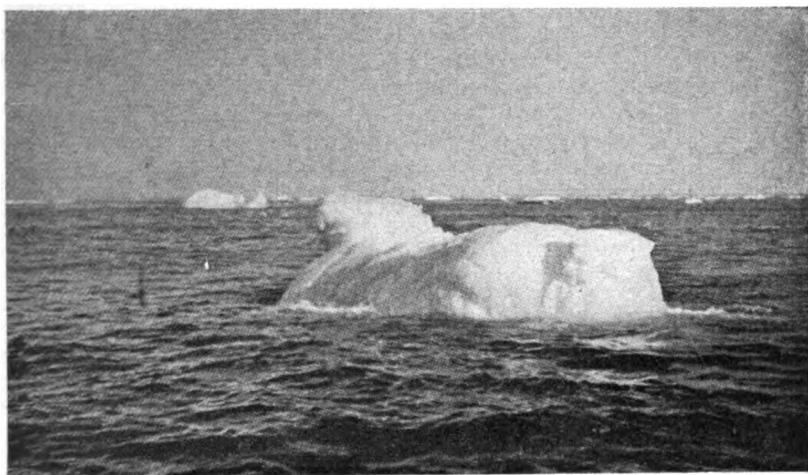
Chart 1199.

- 30 A vessel drawing more than 20 feet (6^m1) can pass outside Chiu-shan lieh-tao (Kue-shan islands) and thence proceed through Hsiao-pan men, following thereafter the directions given on page 380.

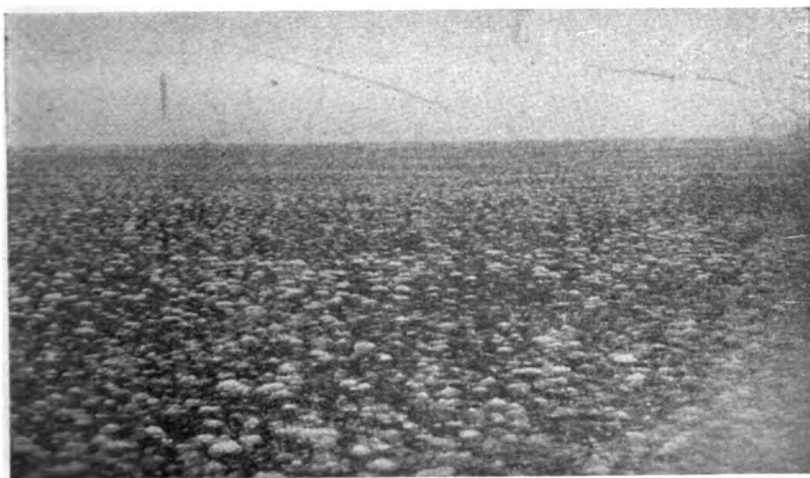
- ICE.**—In winter, in Yellow sea, the fall of sea temperature with increasing latitude is considerable and ice accordingly forms along the
35 northern shore of Yellow sea, the north-western coast of Korea and the whole of the shores of Po hai (Gulf of Pohai) and Liao-tung wan (Gulf of Liaotung). The duration of the sea-ice in average years is from the middle or latter part of November to the end of March, with the exception of a small area at the mouth of Yalu Chiang or Amnok
40 kang, where ice persists through April. The maximum ice-cover over the whole region is in January, but the extent of ice in February is almost as much. The following remarks refer to the ice conditions in average years, unless otherwise stated.

- Po hai and Liao-tung wan.**—At the entrance to Hai ho severe
45 frosts and snow accompany northerly and easterly gales towards the end of November. Thin ice then forms rapidly at low water on the extensive mud flats, and is carried by the flood tide into the rivers, which become frozen up about the middle of December. The sea-ice becomes compact at this time, and fills the head of Po hai within a
50 line drawn south-south-westward from Sha-lei-t'ien tui (Shaluitien banks); the inmost part near the mouth of Hai ho is unnavigable. In January the unnavigable ice extends further seaward; it also continues southward along the western shore of Po hai as far as Lai-chou wan (Lai-chau bay) and is then the largest area of such ice
55 in the region included in the present volume. In February the area of

To face page 10.



Bergy bits (glacier ice).



Brash-ice.

unnavigable ice off Hai ho is somewhat decreased, but the extension to Lai-chou wan persists. Throughout the ice season icebreaker assistance is available for entry into Hai ho, when required, *see* page 471.

In January an ice-field, 23 miles in extent and 6 inches thick, has been passed through south-eastward of Taku. Early in February, floating ice has been encountered about 75 miles south-eastward of Taku, whilst 32 miles further in the ice was packed and from 20 to 30 inches (0^m5 to 0^m8) thick; detached masses of ice were carried along the coast of Sha-lei-t'ien (Shaluitien) tao by the current, but inside the island the ice appeared to be fast.

Liao ho, which flows out in the north-eastern corner of Liao-tung wan, is frozen over from December to March, *see* page 499. Heavy ice occurs over an area off the mouth of this river in January and February; Newchwang light-vessel is withdrawn from about November 15th to April 1st on account of ice.

The whole of the shores of Po hai and Liao-tung wan, from westward of Ch'i-mu-tao kao-chiao (Chimatao promontory) to Lao-t'ieh-shan-hsi chiao (Liau-ti-shan promontory), is bordered by a belt of ice of varying extent from December to March inclusive. The port of Ch'in-huang-tao (Chinwangtao) is, however, often ice-free, *see* page 477. Most of this coastal ice appears to be navigable by ordinary vessels in average years, but it must be emphasised that ice conditions vary very much in different years and ice difficult or impossible for any but high-powered vessels to navigate may be met in some years.

Where the areas of unnavigable ice, referred to above, occur, the belt of lighter ice is found on their seaward sides.

The central part of Po hai and Liao-tung wan is mainly ice-free, but areas of drift-ice may be met at times, in January to March, and also in the narrowest part of Pohai strait. An area of drift-ice unnavigable except by reinforced vessels may be met in the central part of the head of Liao-tung wan in January and February.

Ice does not normally occur on the northern coast of Shan-tung pan-tao (peninsula), eastward of Pohai strait, but Yen-t'ai chiang (Chefoo harbour) was frozen over in January, 1878, *see* page 440.

Northern coast of Yellow sea.—The coast between Lao-t'ieh-shan-hsi chiao and Yalu chiang is bordered by a belt of ice of varying extent in January and February. This ice is in process of formation in December and in process of disappearance in March. Much of it appears to be navigable by ordinary vessels in average years but the ice conditions probably vary very much in different years. The ice at Ta-lien chiang (Dairen kō) is described on page 688; icebreakers are used to keep the port open.

Yalu chiang is practically closed to navigation from about the beginning of November to about the end of April, *see* page 663. There is an area of unnavigable ice off its mouth from January to March inclusive, and lighter ice persists here until the end of April.

North-western coast of Korea.—The ice off the mouth of Yalu chiang extends into the northern part of the bight between this river and Changsan got (Choppeki point). Taedong gang (Pinyang inlet), usually freezes over from late December until the middle of March and is then impassable above Chinnanp'o (Chinnampo), *see* page 641; ice forms in the bight off the mouth of the inlet in December. The maximum amount of ice occurs in January but it does not appear, in average years, to form a continuous belt along the shores

of the bight. The ice off Taedong gang disappears at about the end of March; the ice eastward of Yalu chiang remains through most of April.

- In the large bight to southward of Changsan got, in which the
 5 port of Inch'ön is situated, ice forms at about the end of December. In January and February there is a belt of ice along the shore both northward and southward of the estuary of Han gang or Seoul river, that to the southward being the widest. This disappears in March except for a small area off the mouth of Han gang which persists
 10 till about the end of that month.

Eastward of Ch'olsan pando (Chorusan peninsula), which forms the eastern boundary of the estuary of Yalu chiang, the sea-ice in the above-mentioned bights, in average years, is navigable by ordinary vessels.

- 15 **Descriptive terms.**—The definitions of descriptive terms in general use for the various kinds of ice found at sea are given below. A list of other terms associated with ice and ice navigation follows. Where double terms are used, e.g. slush/sludge, either of the two terms may be used.

- 20 **Anchor ice/Ground ice.**—Ice found attached or anchored to the bottom, irrespective of the nature of its formation.

Bay-ice.—See under Ice shelf. See also under Young ice.

- Bergy-bit.**—A medium sized piece of ice, generally less than $16\frac{1}{2}$ feet (5^m0) above sea level and about the size of a small cottage, mainly
 25 originating from glacier ice, but occasionally a massive piece of sea-ice or disrupted hummocked ice. When the sea-ice origin is not in doubt the term Floeberg may be used. See view facing page 10.

- Brash-ice.**—Accumulation of small fragments not more than $6\frac{1}{2}$ feet (2^m0) across, the wreckage of other forms of ice. See view facing
 30 page 10.

- Close pack-ice/Close drift-ice.**—Composed of floes mostly in contact, such that navigation is difficult even for specially constructed vessels and ice-breaker assistance may be required. Ice cover
 35 $6/8$ to $7/8$. See view facing page 14.

Drift-ice.—See Pack-ice. See also under Very open pack-ice.

- Fast-ice.**—Sea-ice which remains fast, generally in the position where originally formed, and which may attain a considerable thickness. It is found along coasts, where it is attached to the shore, or over
 40 shoals, where it may be held in position by islands, grounded icebergs or grounded polar ice. Subdivisions are Winter fast-ice and Polar fast-ice.

- Firn-snow/Névé.**—Snow which has become coarse-grained and compact through temperature changes, forming the transition
 45 stage to glacier-ice.

Fjord-ice.—Term used by Scandinavians for level ice originating in fjords. See view facing this page.

Floe.—See Ice-floe.

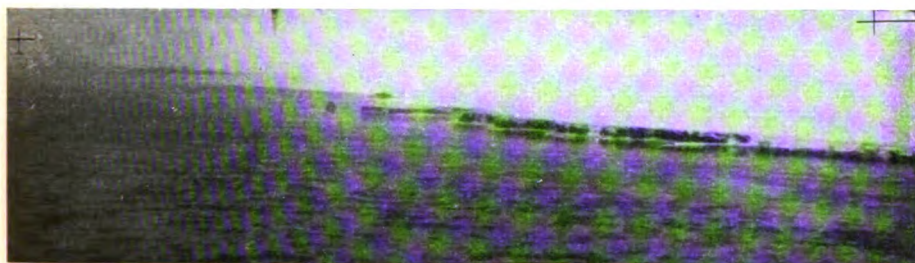
Floeberg.—See Bergy-bit.

- 50 **Frazil crystals.**—See Ice crystals. See view facing page 19.

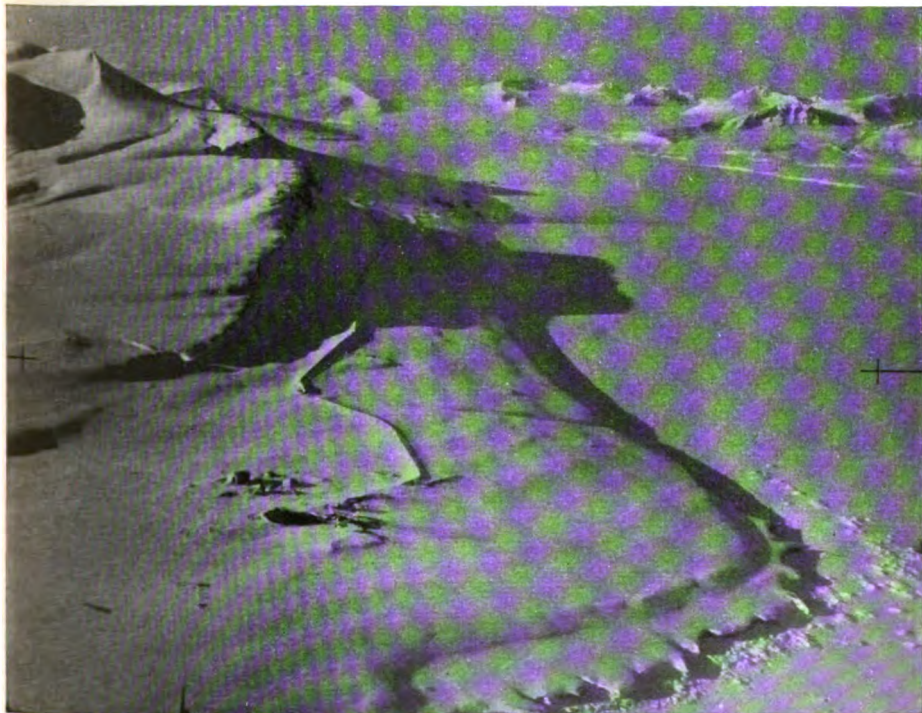
Glacier berg.—Mass of glacier-ice which has broken away from its parent formation on the coast, and either floats, generally at least $16\frac{1}{2}$ feet (5^m0) above sea level, or is stranded on a shoal. See views facing pages 13 and 14.

- 55 **Glacier ice.**—Any ice floating on the sea as a berg, which originates from a land glacier.

To face page 12.



Brash and rotten ice.

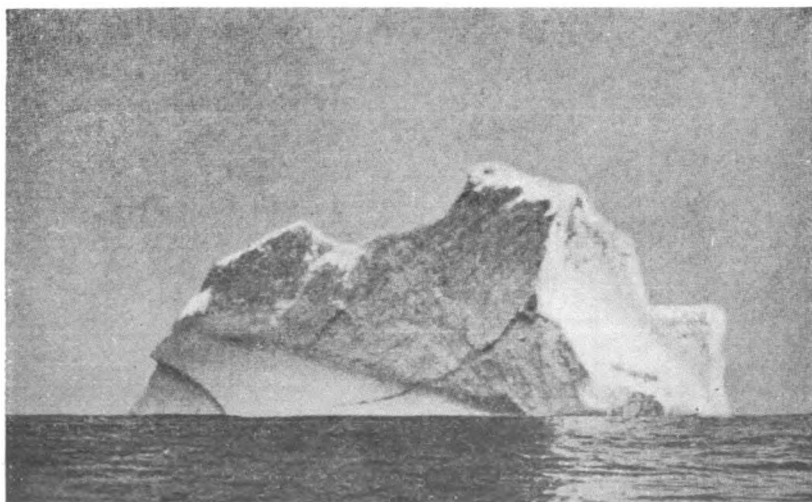


Fjord ice.

To face page 13.



H u m m o c k e d i c e .



G l a c i e r b e r g .

Ground ice.—*See* Anchor ice.

Growler.—Smaller piece of ice than a bergy-bit, frequently appearing greenish in colour and barely showing above water. May originate both from sea-ice and from glacier-ice.

Hummocked ice.—Ice piled haphazardly one piece over another. 5
See view facing this page.

Iceberg.—Large mass of floating or stranded ice piece, more than $16\frac{1}{2}$ feet (5^m0) above sea level, which has broken away either from a glacier or from an ice shelf formation. Subdivisions are Glacier 10
berg and Tabular berg.

Ice-cake.—A floe smaller than $32\frac{1}{2}$ feet (10^m0) across. One less than $6\frac{1}{2}$ feet (2^m0) across may be termed a small cake. *See* Brash-ice.

Ice-crystals/Frazil crystals.—Fine spicules or plates of ice, suspended in water. *See* view facing page 19.

Ice-floe/Floe.—A piece of sea-ice, other than fast-ice, large or small, 15
described if possible as "Light" or "Heavy" according to thickness.

Big—over half a mile (1000^m0) across

Medium—220 yards to half a mile (200^m0 to 1000^m0) across

Small—11 to 220 yards (10^m0 to 200^m0) across. 20

Ice-rind.—A thin, elastic, shining crust of ice, formed by the freezing of slush/sludge on a quiet sea surface. Thickness less than 2 inches (5 cm.). It is easily broken by wind or swell, and makes a tinkling noise when passed through by a ship.

Level ice.—Ice with a flat surface which has never been hummocked. 25

Melt-water pool.—A depression on the surface of an ice-floe filled with melt-water, in most cases fresh and drinkable.

Névé.—*See* Firn-snow.

New ice.—A general term which includes Ice crystals/Frazil crystals, Slush/Sludge, Pancake ice and Ice-rind. 30

Old bay-ice.—Level ice of more than one winter's growth, which has remained unhummocked and also becomes nourished by surface layers of snow. Thickness of ice and snow up to about $6\frac{1}{2}$ feet (2^m0) above sea level.

Open pack-ice/Open drift-ice.—Floes seldom in contact and with 35
many leads and pools. Ice cover $3/8$ - $5/8$. Navigation should be comparatively easy for specially constructed vessels and in the lower categories, with ice cover $3/8$ or $4/8$, even for ordinary vessels.

Pack-ice/Drift-ice.—Term used in a wide sense to include any area of 40
sea-ice, other than fast-ice, no matter what form it takes or how disposed.

Pancake ice.—Pieces of newly-formed ice, usually approximately circular, about one to 10 feet (30 cm. to 3^m0) across, and with raised rims, due to the pieces striking against each other, as the 45
result of wind and swell. *See* views facing pages 15 and 17.

Polar fast-ice.—Fast ice formed by the grounding and cementing together of polar ice. By the end of the winter it may reach some tens of miles (kilometres) from the coast.

Polar ice.—Extremely heavy sea-ice, up to 10 feet (3^m0) or more in 50
thickness, of more than one winter's growth. Heavily hummocked, and may ultimately be reduced by weathering to a more or less even surface. *See* view facing page 16.

Pressure-ice/Screw-ice.—A general term for ice which has been squeezed together and in places forced upwards. Subdivisions are 55
Rafted ice, Hummocked ice, and Pressure ridge.

Rafted ice.—Type of pressure-ice/screw-ice formed by one floe over-riding another.

Rotten ice.—Ice which has become honeycombed in the course of melting and which is in an advanced state of disintegration. *See* view facing page 12.

Screw-ice. *See* Pressure-ice.

Sea-ice.—Any form of ice found at sea which has originated from the freezing of sea water.

Sludge—*See* Slush. *See* view facing page 16.

10 Slush/Sludge.—An accumulation of ice crystals which remain separate or only slightly frozen together. It forms a thin layer and gives the sea surface a greyish or leaden-tinted colour. With light winds no ripples appear. *See* view facing page 16.

String.—*See* Stream.

15 Strip.—*See* Stream.

Stream/Strip/String.—Long narrow area of pack-ice/drift-ice, about half a mile (1000^m) or less in width, usually composed of small fragments detached from the main mass of ice, and run together under the influence of wind, swell or current.

20 Tabular berg.—A flat-topped berg, showing horizontal firn-snow/névé layers, usually broken off from an ice shelf formation.

Very close pack-ice/Very close drift-ice.—Ice cover practically 8/8 and little if any water present. *See* view facing page 15.

Very open pack-ice/Very open drift-ice.—Water preponderates over ice. Ice cover 1/8 to 2/8. (Formerly known in Britain as "drift-ice").

Weathered ice.—Hummocked polar ice subjected to weathering which has given the hummocks and pressure ridges a rounded form. If the weathering continues, the surface may become more

30 or less even.

Winter fast-ice.—Fast ice in fjords, gulfs and straits, mainly formed by growth from the shore, but also by cementing of pack-ice/drift-ice. Winter fast-ice rises and falls according to the tide.

Winter-ice.—More or less unbroken level ice of not more than one winter's growth, originating from young ice. Thickness from 6 inches to 6½ feet (15 cm. to 2^m0). Completely safe for travelling purposes.

40 Young ice.—Newly-formed level ice generally in the transition stage of development from ice-rind, or pancake ice to winter-ice; thickness from 2 to 6 inches (5 cm. to 15 cm.), as a rule impassable and unsafe for travel either by men or dogs, or in the case of aircraft for ski or wheel landings. (Young ice was frequently referred to as "bay-ice" by British whalers in the early 19th century). *See* view facing page 17.

45 **Associated terms.**—

Belt.—Long area of pack-ice/drift-ice from a few miles (kilometres) to more than 54 miles (100 kilometres) in width.

Beset.—Situation of a vessel when closely surrounded by ice and unable to move.

50 Blink.—*See* Ice-blink.

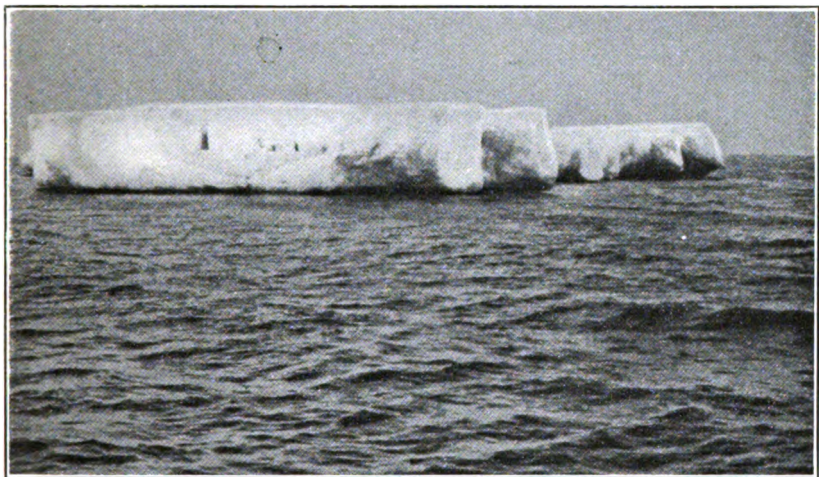
Boring.—Forcing a vessel through brash-ice or young ice, under power or sail.

Calving.—The breaking away of a mass of ice from a glacier or ice-berg.

55 Débâcle.—Break-up of the ice in rivers in spring. *See* Ice-gang.

Flaw.—*See* Shore-lead.

To face page 14.



Glacier berg, blocky form (Arctic).



Close pack-ice.

To face page 15.



Very close pack-ice of light floes, with
two small icebergs.



Pancake ice.

Frost smoke.—Fog-like clouds due to the contact of cold air with relatively warm sea water, which appear over newly-formed leads / lanes and pools, or to leeward of the ice-edge, and which may persist while sludge / slush and young ice are forming.

Glacier tongue.—Projecting seaward extension of glacier usually afloat. 5

Hummocking.—Process of pressure formation by which level ice becomes broken up into hummocky pack. Where the floes rotate in the process it is termed "screwing".

Ice-anchor.—Hook or grapnel adapted to take hold upon ice. 10

Ice-bar.—Ice-edge consisting of floes compacted by sea and swell, and difficult to penetrate.

Ice-blink.—The white or yellowish-white glare on the sky, produced by the reflection of considerable areas of sea-ice or land-ice, which may be beyond the range of vision. See view facing page 17. 15

Ice chisel.—A long chisel of stout construction for cutting holes in ice.

Ice-edge.—The boundary at any given time between the open sea and sea-ice of any kind, whether floating or fast. See view facing page 18.

Ice-field.—Area of pack-ice / drift-ice, consisting of any size of floe, of such extent that its limits cannot be seen from the masthead. When by air observation or otherwise, the full extent of an ice-field is known, the following terms may be used :—

Large—over 10½ miles (20 km.) across

Medium—8 to 10½ miles (15 to 20 km.) across 25

Small—5½ to 8 miles (10 to 15 km.) across.

Icefoot.—Ice step attached to the coast, unmoved by tides and remaining after the fast-ice has moved away. Several varieties of icefoot can be distinguished.

Ice front.—The floating seaward-facing cliffs of an ice shelf on any given date (e.g. "Ross Ice front (1911)"). 30

Ice-gang.—Term used to denote the movement (in rivers, etc.), of a vast field of hurrying masses of thick heavy ice ; ice conditions after the débâcle.

Ice limit.—Average position of the ice-edge in any given month or 35 period based on observations over a number of years.

Ice shelf.—A term used in a wide sense for ice formations with level surface which originate from accumulations of firn (or névé) layers either upon persistent sea-ice or upon the seaward extension of land glaciers, but now essentially nourished by annual accumulations of snow. The seaward edge, known as the ice front, is afloat. The initial sea-ice stage is called bay-ice. Special features are (a) the great horizontal extent of the feature, and (b) the vertical cliffs of the ice front which rise to heights of up to 150 feet (45m7). The latter show prominent horizontal banding and clean-cut joint-faces from which tabular bergs periodically break off. 40

Ice-spear.—A light wooden staff with a metal point, used for testing whether it is safe to walk on thin sea-ice.

Lane.—See Lead.

Lead / lane.—A navigable passage through pack-ice / drift-ice. See 50 view facing page 18. A lead / lane may still be so named even if covered with young ice.

Moraine.—Rock debris associated with a glacier.

Nip.—Ice is said to nip when it closes up so as to prevent the passage of a vessel. A vessel so caught, though undamaged, is said to be 55 "nipped".

Nunatak.—An isolated rocky peak rising from a sheet of inland ice.
 Pressure area.—Area of hummocked ice formed by floes pressed together and piled up.

Pressure ridge.—Ridge or wall of hummocked ice where floes have
 5 been pressed against each other.

Rafting.—Caused by floes meeting, when the edges are broken off and one floe passes over the other. A mild form of pressure.

Sallying.—Rolling vessel by means of crew running from side to side in order to loosen ice round the ship and allow her to make headway.

10 Screwing.—*See* Hummocking.

Shore-lead.—A lead between pack-ice/drift-ice and the shore, or between pack-ice/drift-ice and a narrow fringe of fast-ice.

Submerged ice foot.—An underwater ice projection from an iceberg or an ice-floe/floe.

15 Tide-crack.—The line of junction between an immovable icefoot and fast-ice, the latter being subject to rise and fall of the tide.

Tongue.—A projection of the ice-edge up to several miles (kilometres) in length, caused by wind or current.

Water-sky.—Dark streaks in the sky due to reflection on the clouds
 20 of leads/lanes, pools, or open water in the neighbourhood of large areas of sea-ice.

Working.—Making headway through pack-ice/drift-ice.

CURRENTS.—The surface currents of the region included in this volume comprise Kuro shio, which forms part of the main circulation

25 of the North Pacific ocean and flows northward and north-eastward along the eastern coasts of Luzon and Formosa throughout the year, and the monsoon currents of Yellow sea, the coastal region of Eastern sea, and Formosa strait, which reverse in direction according to the monsoon wind. Water branches from Kuro shio to enter the central
 30 part of Eastern sea and also, during the south-west monsoon period, to pass northward along the western coast of Formosa.

The general circulation is shown in Figures 1 to 4. The figures at the tail of each arrow give the average rate of the current in miles per day. The observations available in Yellow sea are not numerous
 35 and there are none in Po hai and Liao-tung wan.

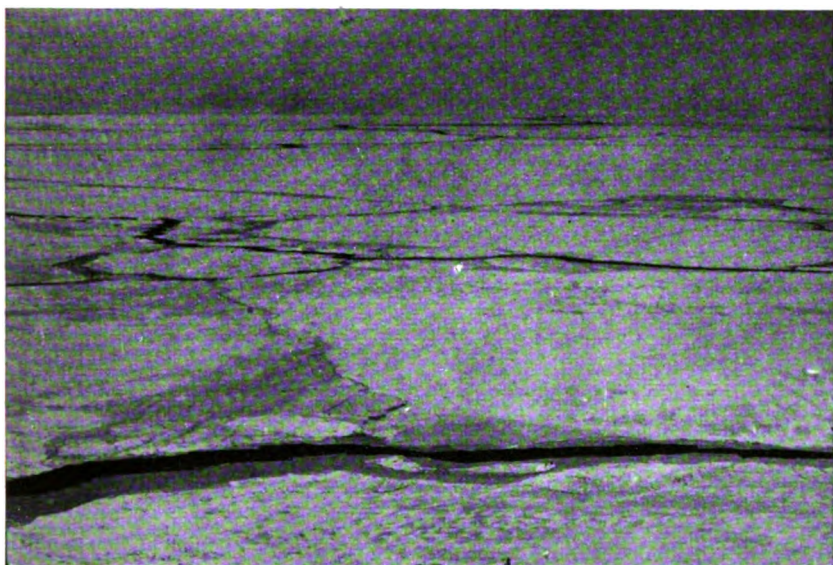
Kuro shio.—On approaching the eastern coasts of the Philippine islands, the North Equatorial current of the Pacific ocean divides, one part turning southward along the eastern coast of Mindinao. The other branch turns north-westward and northward passing along
 40 the eastern coasts of Luzon and Formosa to form Kuro shio, a warm current corresponding to the Gulf stream of the North Atlantic. Southward of the Japanese islands, Kuro shio flows north-eastward; the current then fans out to form the North Pacific current, which sets eastward across the ocean to the American coast.

45 Close to the eastern coast of Formosa a southerly countercurrent is often perceptible.

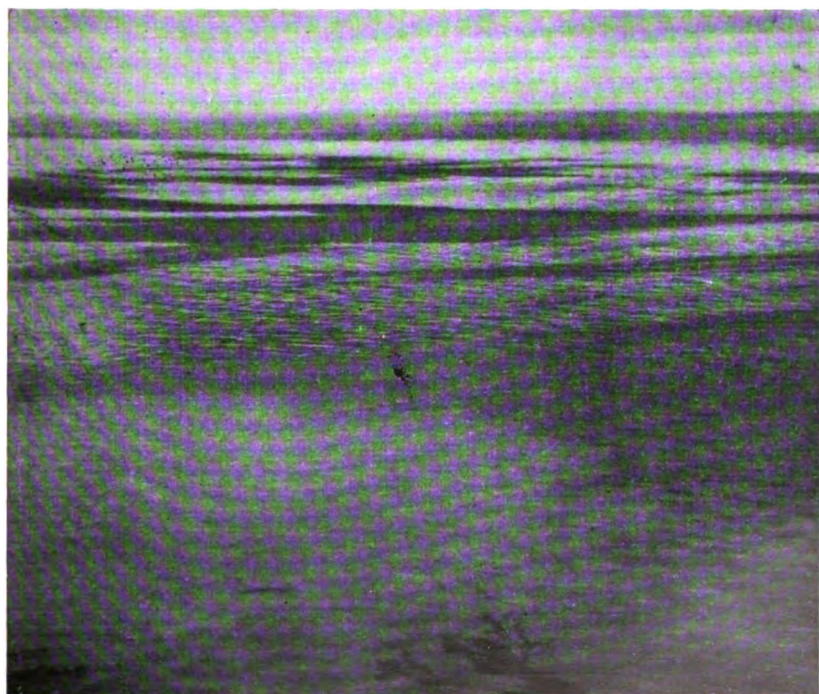
Monsoon currents.—The table on page 17 gives the periods of the monsoon currents in average years in various parts of the region included in the present volume.

50 The current of the north-east monsoon emerges southward from the western part of Yellow sea, *see* Figure 1, and flows parallel to the coastline through the western part of Eastern sea. It fills the whole of Formosa strait and continues past Hong Kong, following the trend of the coastline of China and therefore taking in succession south-
 55 westerly and west-south-westerly directions.

To face page 16.



Polar ice.



Sludge or Slush.

To face page 17.



Young ice forming from Pancake ice.



Iceblink.

	Current of the North-east Monsoon	Transition	Current of the South-west Monsoon	Transition
Region of Hong Kong	October to May*	—	June to September	—
Formosa Strait	October to March†	—	April to August†	September
Eastern Sea, western part	October to March	—	April to August	September
Yellow sea	September to April	—	May to August	—

*In March, April and May, about one-third of the currents set in the opposite direction.

†In March and April, about one-third of the currents on the western side of Formosa strait set in the opposite direction.

During the north-east monsoon period water branches off from the western side of Kuro shio to flow north-westward through Luzon strait ; this water gradually recurves into the general south-westerly monsoon current of the northern part of the China sea.

The current of the south-west monsoon, *see* Figures 2 and 3, 5 flows north-eastward past Hong Kong and through Formosa strait, on the eastern side of which it is joined by a branch of Kuro shio. This is the branch previously mentioned as passing north-westward through Luzon strait ; at this season it flows through Pescadores channel and along the western coast of Formosa, uniting again with the main part of Kuro shio off the northern extremity of Formosa. 10 It has not the same steady flow as Kuro shio eastward of Formosa and is considerably affected by the winds.

The current of the south-west monsoon sets north-eastward through the western and northern parts of Eastern sea, parallel to the flow of Kuro shio, which occupies the eastern and southern parts of that sea. A branch of the monsoonal current sets northward into the central part of Yellow sea ; the remainder passes towards Korea strait, after flowing through which it forms the Tsushima current of the Japan sea. The main body of Kuro shio is directed towards the southern coasts of Kyushu and Honshu, along which it flows, but some of its water fans out northward into the central part of Eastern sea, to join the monsoonal flow. The current setting through Korea strait during the south-west monsoon period is therefore a mixture of the monsoonal current and water from Kuro shio. 25

In the transition month of September, *see* Figure 4, the currents in the coastal region between Lien-hua-feng chiao and Chou-shan ch'ün-tao are variable ; they may set along the coast in either direction.

Yellow sea.—Owing to lack of observations the current circulation of Yellow sea is not fully known. Apart from the monsoonal drifts 30 in the western and central parts of the sea, referred to above, there may be coastal currents or eddies. During the north-east monsoon period, from September to April, part of the south-going water in the central and eastern parts of the sea turns south-eastward and eastward, southward of the Korean peninsula, to flow through Korea 35 strait. As the general monsoonal flow of Eastern sea is directed away from Korea strait at this season, the water turning south-eastward out of Yellow sea appears to be the only source of the Tsushima current of the Japan sea during these months.

Constancy of current.—Monsoon currents have a considerable degree of variability, and even in the height of each monsoon, currents may at times be experienced running in the opposite direction to the monsoon current, or, in general, in any other direction round the compass.

5 In either monsoon, the wind fluctuates considerably in strength, owing to variations in the distribution of atmospheric pressure. Other winds may also intervene for a time ; in these are included the winds of depressions and typhoons. The north-east monsoon is stronger and less liable to interruption than the south-west monsoon.

10 From the observations available, the most constant current in both monsoons, within the region covered by this volume, occurs in parts of the region of Formosa strait and the adjacent Chinese mainland, from Hong Kong northward. The precise part of this region where the current is most constant varies to some extent in different months
15 of the same monsoon period.

Kuro shio is a relatively constant current during the whole year. The most constant part of this current within the region covered by the present volume is that eastward and north-eastward of Formosa. In this locality the percentages of all observed currents setting in the
20 directions northward, north-north-eastward and north-eastward are, respectively, as follows :—December to February, 68, March to May, 80, June to August, 81, September to November, 71 ; of these directions, north-north-eastward is the most frequent.

Strength of Current.—The remarks which follow and those on the
25 constancy of current, above, are based on observations received for the period 1855 to 1939.

The average rates of the monsoonal currents are given, for the four months named, in Figures 1 to 4. These rates vary to some extent in successive months of the same monsoon. Comparison of the rates
30 during each month of the year has shown that, although the north-east monsoon wind is stronger and more constant than the south-west monsoon wind, the rates of the currents produced by the two winds do not differ materially, but there are indications in some months that the current of the north-east monsoon is slightly the
35 stronger in certain regions.

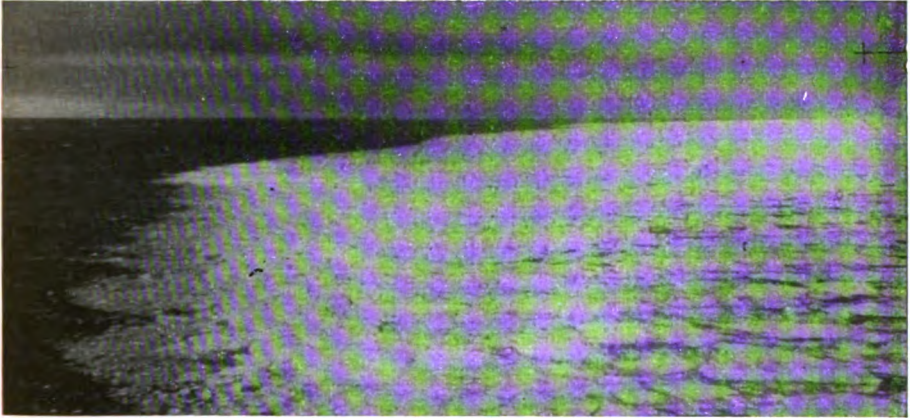
More than half of the monsoonal currents observed throughout the year do not exceed the rate of one knot. A small proportion of the currents exceed 2 knots ; these have been reported in the Formosa strait region in every month of the year except August and October and
40 occasionally in the western part of the Eastern sea, in either monsoon.

Information about the rate of Kuro shio, eastward of Formosa, is given, for quarterly periods, in the following table. In all quarters of the year the great majority of all currents observed exceed the rate of one knot.

	December to February	March to May	June to August	September to November
Average rate, in miles per day	38	32	37	31
Percentage of currents, exceeding 2 knots	19	16	20	12
Percentage of currents exceeding 3 knots	2½	4	4½	0

45 Kuro shio is thus strongest in winter and summer ; its rate in winter does not appear to be diminished by the north-east monsoon.

To face page 18.



Ice-edge.



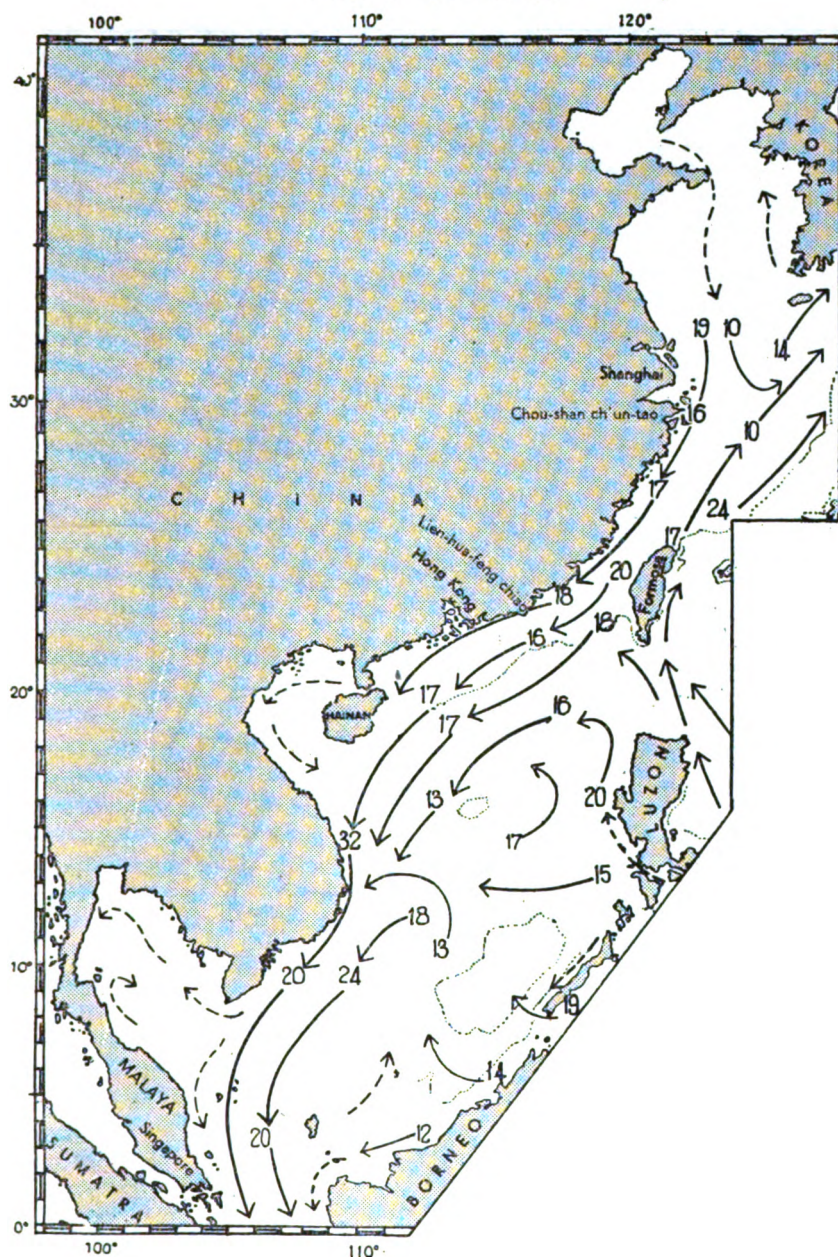
A lead in pack-ice.



Ice Crystals or Frazil crystals.

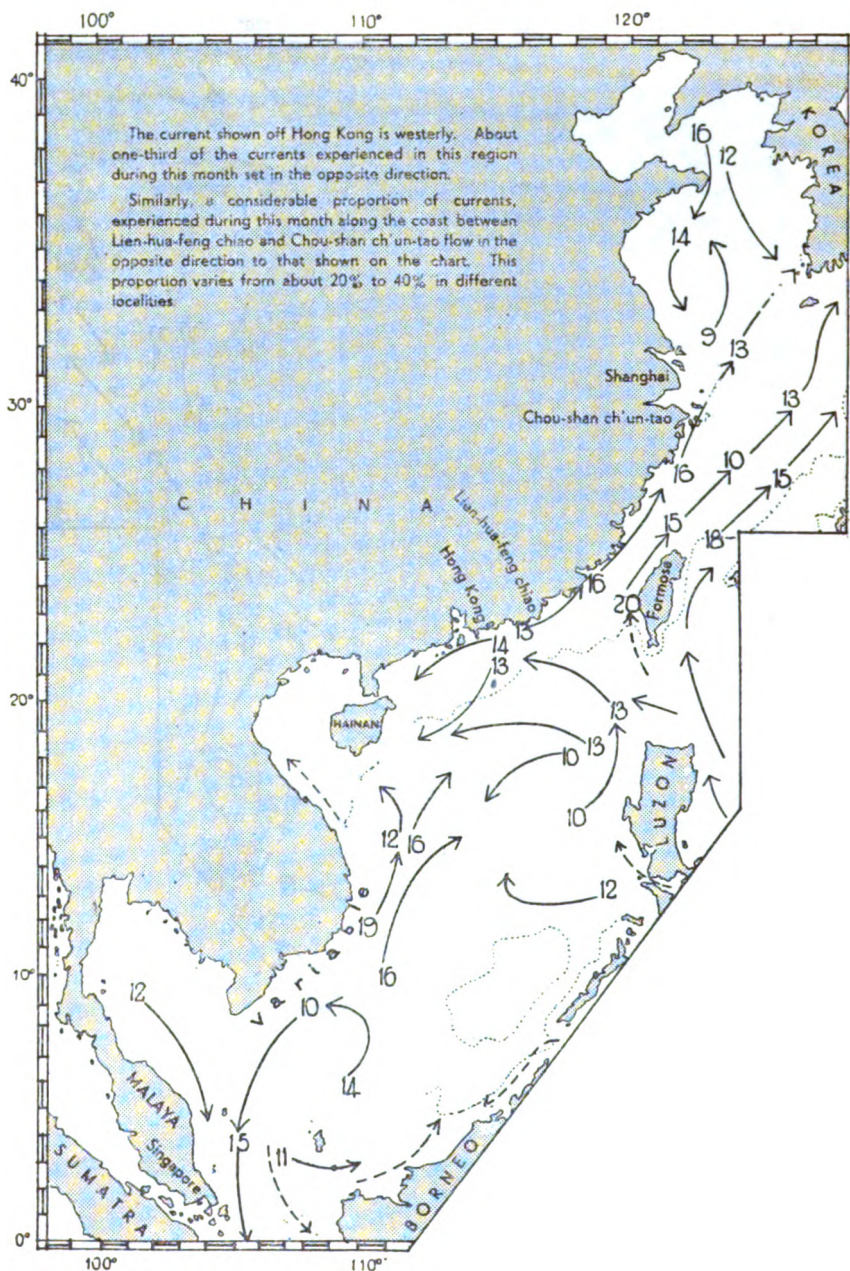
GENERAL SURFACE CURRENT CIRCULATION.

Fig. 1. January.



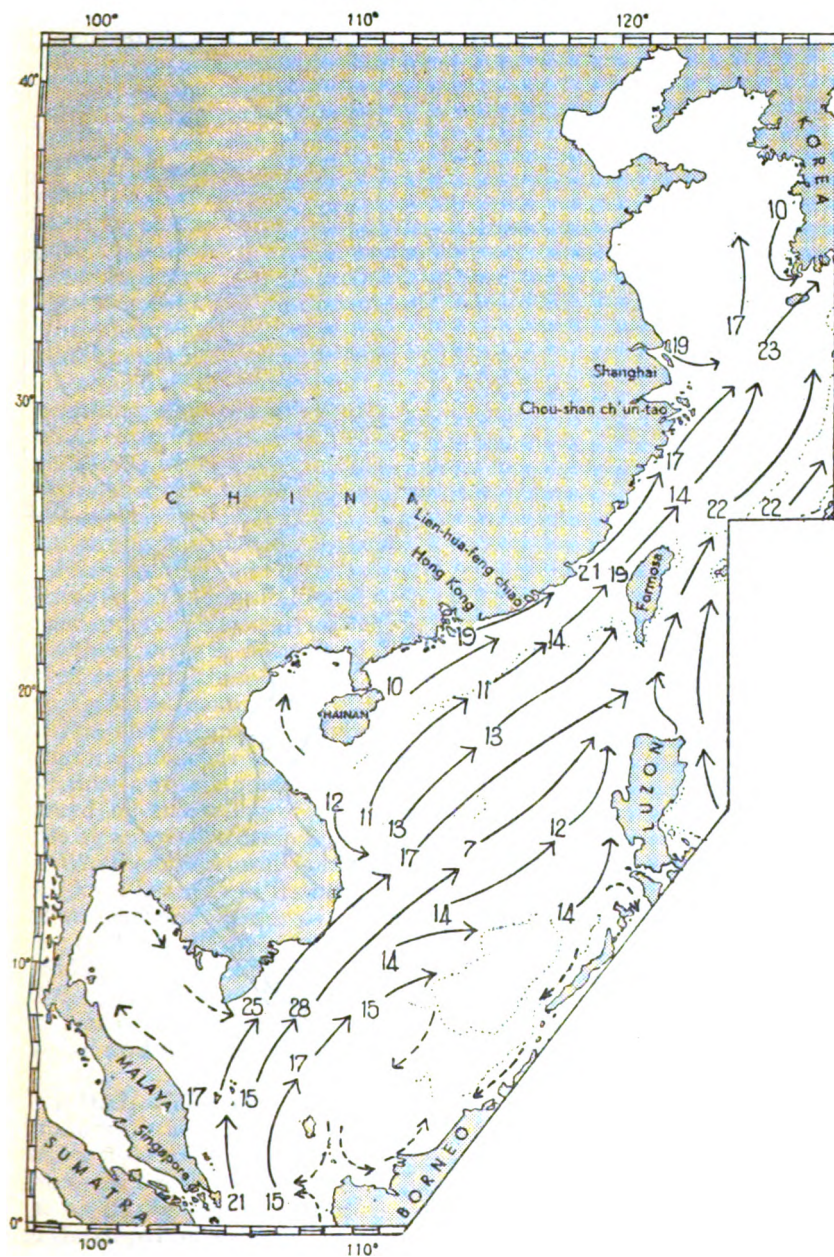
GENERAL SURFACE CURRENT CIRCULATION.

Fig. 2. April.



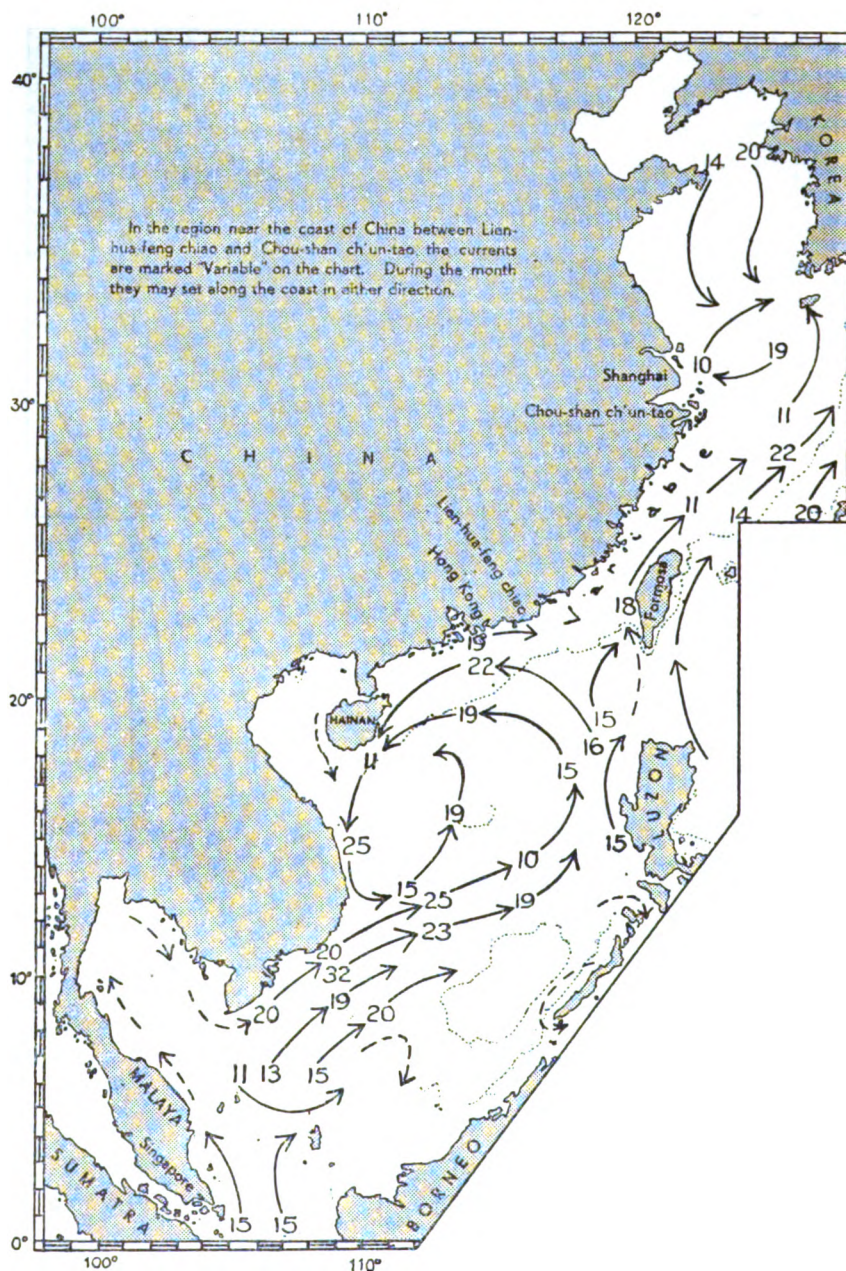
GENERAL SURFACE CURRENT CIRCULATION.

Fig. 3. August.



GENERAL SURFACE CURRENT CIRCULATION.

Fig. 4. September.



Effect of a tropical revolving storm on the current.—In the vicinity of a tropical revolving storm the set and drift of current may be markedly different from that normally to be expected. Comparatively little is known about such currents, particularly near the centre of the storm, since navigators avoid the centre whenever possible and conditions within the storm field generally are unfavourable to the accurate observation of current. 5

The primary cause of the currents is the strong wind associated with the storm ; the strength of current produced by a given force of wind varies with latitude and is greatest in low latitudes. For the latitudes of tropical storms, say 15° to 25° , a wind of force 10 would produce a current of about one knot. It is believed that the strength of the currents of tropical storms is, on the average, the same as that which wind of similar force, unconnected with a tropical revolving storm, would produce. These currents, at the surface of the water, set at 45° to the right of the wind direction (in the northern hemisphere) and therefore flow obliquely outward from the storm field, though not radially from the centre. 15

Unless due allowance is made for these sets, very serious errors in reckoning may therefore arise. It is reported that, in one case, a vessel experienced a south-easterly set of more than 50 miles, under conditions when the set normally to be expected was south-westerly. In another case, an unexpected south-south-westerly set of 60 miles was experienced in 18 hours. These are examples of currents of abnormal strength, which are occasionally met in the vicinity of tropical revolving storms, and which cannot be accounted for by the wind strength. The possibility of such an experience should be borne in mind, particularly near, say within 100 miles of the centre of the storm. 25

Other currents, not caused directly by the wind, may flow in connection with these storms but are probably weak and therefore negligible in comparison with the wind current. 30

The above remarks apply to the open ocean. When a tropical storm approaches or crosses an extended coastline, such as that of Florida, a strong gradient current parallel with the coast will be produced by the piling of water against the coast ; the sea-level may rise by as much as from 8 to 15 feet (2^m4 to 4^m6) on such an occasion. 35

Whether the storm is in the open ocean or not there is a rise of sea-level inwards to its centre which compensates for the reduction of atmospheric pressure. The extent of this rise is never great, from one to 2 feet (0^m3 to 0^m6) according to the intensity of the storm ; it produces no current so long as the storm is not changing in intensity. If the storm meets the coast, however, the accumulation of water at its centre will enhance the rise of sea level at the coast mentioned above and so produce a stronger gradient current along the coast. 40

TIDAL STREAMS.—The tidal oscillation of the Pacific ocean produces a flow of water towards the China coast on the rising tide, and a flow away from it on the falling tide. In the deep waters of the open ocean, far from land, these streams are quite negligible, so far as navigation is concerned. Their rate increases with decrease in the depth of water as the continent is approached, and is increased still more by the presence of the islands off the Asian coast, which force the water into comparatively narrow channels. 45

Hence, on the rising tide, the tidal streams set generally westward from the Pacific ocean into the China sea through the channels between the northern coast of Luzon and the southern end of For- 55

mosa. Thence the flow is north-westerly past Pratas reef, and north-easterly, parallel to the shore, along the coast of China from Hong Kong almost up to the mouth of Ch'ang Chiang. The streams along the south-western coast of Formosa set north-westward
 5 parallel to the shore, and north-eastward, parallel to the shore, along the central part of the western coast of Formosa. The flow from the Pacific ocean also comes round the northern end of Formosa and sets south-westward parallel to the western coast of Formosa. These two streams in opposite directions meet somewhere about half way
 10 along the western coast of Formosa. Through Pescadores islands the stream sets northward on the rising tide; in Pescadores channel the tidal stream is negligible compared to the north-going current flowing through it (see page 16). On the eastern coast of Formosa, the stream sets northward at a rate of less than one knot.











15 Also, on the rising tide, the flow is northward from the Pacific ocean into Yellow sea, and thence north-westward into Po hai. Thus the streams set northward up the western coast of Korea and past the western end of Quelpart island, westward along the southern coast of Kuan-tung pan-tao, and northward along both shores of
 20 Liao-tung wan. In Yellow sea well offshore and for 100 miles or so off the China coast between Ch'ang Chiang and Hsiang-shan Chiang, the streams are rotatory. In general the streams have a maximum rate of from one to 3 knots, except where the local topography causes an increase. Two areas are of particular interest because of
 25 the great range of the tide (about 30 feet (9^m1)), and of the strength of the tidal streams in their vicinity. The first of these is Hang-chou wan; between the islands lying across its entrance streams up to 8 knots are found, and the bore (from 10 to 12 feet (3^m0 to 3^m7) high at springs) in Ch'ien-t'ang Chiang (Kiang), at its head, is one of
 30 the largest in the world. The second is the approaches to Inch'ön; streams of 5 knots or more are found between the islands in the vicinity.

The directions quoted in the paragraph above refer to the streams on the rising tide; in general, the streams on the falling tide flow in the opposite directions. It should also be noted that, in common
 35 with most shores of the Pacific ocean, there is a marked diurnal inequality in the tidal streams. Of the two streams running in the same direction in 24 hours, one is increased in strength and duration, and the other correspondingly reduced, when the moon has a high declination north or south.

40 Local deviations from the general tidal stream pattern outlined above, due to topography, river flow, etc., may be quite considerable, and are described in the text, where the information is available, under the particular locality concerned. It should also be noted that the set due to the tidal streams is additional to that caused by
 45 currents; in general, the tidal streams are more important close inshore and the currents offshore, but this is not always so.

SIGNALS.—China Seas Non-local Storm Signal Code.—This code of visual day signals, originally adopted in 1931, and subsequently amended, has been in general use in the China seas from 1st January,
 50 1950. It is not known whether it is used in places under the control of the Communist Government of China.

The following are the symbols in use:—

									
indicating the figures									
1	2	3	4	5	6	7	8	9	0

The signals are displayed from the yardarms and the mast head of a Storm signal mast and have the following significance :—

(a) *1 symbol at the masthead* : denotes the time at which the centre of a disturbance was in the position indicated, as shown in Table I. 5

(b) *4 symbols at one yard-arm* : denote the position of the centre of the disturbance.

The two upper symbols indicate the latitude in degrees ; the two lower symbols indicate the longitude in degrees.

(Note.—In the case of longitudes of 100° and greater, the initial figure 1 is omitted.) 10

(c) *3 symbols at the other yard-arm* : denote the speed, direction, and intensity of the disturbance.

The two upper symbols of the group indicate the speed and direction of motion of the centre of the disturbance 15 at the time of observation, or, alternatively, certain conditions as shown in Table II. The lowest symbol of this group denotes the intensity of the disturbance, together with the degree of accuracy with which the centre has been located (*see* Table III). The degree of accuracy is specified 20 as the radius of a circle whose centre is indicated by the latitude and longitude ; thus, the position indicated by the latitude and longitude signals does not purport to be the exact position of the centre of the disturbance, but merely the centre of a circle of specified radius within which the 25 centre of the disturbance is believed to lie.

TABLE I.—Single symbol at masthead.
Time of observation.

Code of figures	1	2	3	4	5	6	7	8	9
Hrs. G.M.T.	03	06	09	12	15	18	21	24 00	Position deduced from supplementary in- formation since last warning.

TABLE II.—Two upper symbols of hoist.
Speed and direction of motion ; or conditions.

Code fig. 00	Stationary, or moving at 5 knots or less.			
Speed of motion				
Direction of motion	10 knots	15 knots	20 knots	25 knots or more
	Code fig.			
N.N.E.	01	17	33	49
N.E.	02	18	34	50
E.N.E.	03	19	35	51
E.	04	20	36	52
E.S.E.	05	21	37	53
S.E.	06	22	38	54
S.S.E.	07	23	39	55
S.	08	24	40	56
S.S.W.	09	25	41	57
S.W.	10	26	42	58
W.S.W.	11	27	43	59
W.	12	28	44	60
W.N.W.	13	29	45	61
N.W.	14	30	46	62
N.N.W.	15	31	47	63
N.	16	32	48	64

Conditions			
Code fig.		Code fig.	
65	Curving N.E.	81	Forming, will probably move N.E.
66	" E.	82	" " " " E.
67	" S.E.	83	" " " " S.E.
68	" S.	84	" " " " S.
69	" S.W.	85	" " " " S.W.
70	" W.	86	" " " " W.
71	" N.W.	87	" " " " N.W.
72	" N.	88	" " " " N.
73	Moving N.E., accelerating	89	Forming, movement unknown
74	" E., "	90	Filling up
75	" S.E., "	91	Filled up, no further warnings
76	" S., "	92	Passed inland, no further warnings
77	" S.W., "	93	Passed out of area, no further warnings
78	" W., "	94-98	(Spare numbers)
79	" N.W., "		
80	" N., "	99	Movement and condition unknown

TABLE III.—Lowest of three symbols.

Code fig.	Intensity	Radius of position circle in nautical miles
0	Position and intensity uncertain	—
1	Tropical depression (winds up to 33 knots)	120
2	" " " " "	60
3	" " " " "	30
4	Tropical storm (winds from 34 to 63 knots)	120
5	" " " " "	60
6	" " " " "	30
7	Typhoon (winds 64 knots and over)	120
8	" " " " "	60
9	" " " " "	30

Note.—If no reliable observations of wind force near the centre of the storm are available, the intensity signalled will indicate the highest wind force believed to exist in the storm.

China.—Storm signals.—The following system of visual storm signals was in use at Ch'ing-tao (Tsingtao) in 1953, and may be used at other ports under the control of the Communist Government of
5 China :—

STORM SIGNALS

	Day signal (Symbol)	Night signal (Lights, vertically disposed)	Meaning
10	T	White White White	Tropical storm which may affect the port within 48 hours.
15	●	White Green White	Strong wind (force 6-7) which may affect the port within 24 hours.

STORM SIGNALS—*continued.*

<i>Day signal (Symbol)</i>	<i>Night signal (Lights, vertically disposed)</i>	<i>Meaning</i>
▲	White Green Green	Wind above force 8 from north to west may affect the port within 12 hours. 5
▼	Green White White	Wind above force 8 from south to west may affect the port within 12 hours. 10
▲▲	Green Green White	Wind above force 8 from north to east may affect the port within 12 hours.
▼▼	White White Green	Wind above force 8 from south to east may affect the port within 12 hours. 15
▼▲	Green Green Green	Wind increasing but will not reach force 12.
+	Red Green Red	Typhoon (above force 12) will soon reach the port. 20

GENERAL STRONG WIND SIGNALS

(Used when wind above force 6 and not connected with a tropical storm may reach the port within 6 hours.) 25

■	Green Green	Wind force 6-7.
◆	Red Green	Wind above force 8.

Supplementary storm signals.—The following signals were formerly displayed from the Custom house flagstuffs at San-tu yang (anchorage), Yin-hsien (Ningpo), and Chen-hai (Chinhai), and may still be in use:— 30

By day:

- (a) Probable bad weather: one black ball.
- (b) Probable typhoon or strong gale: one black cross. 35

At night:

- (a) Probable bad weather: one red light at the masthead.
- (b) Probable typhoon or strong gale: two red lights disposed horizontally.

The night signals are not shown at San-tu yang. 40

These supplementary storm signals were primarily intended as a warning for small craft in the harbour.

Philippine islands.—**Storm signals.**—The following system of visual storm warning signals was in use in the Philippines, in 1953. These signals are displayed at Aparri, Calayan, and Basco, within the limits of this volume. 45

No.	Day signal (Symbol)	Night signal (Lights)	Meaning
5	1	● One red	Winds of unspecified direction, speed from 22 to 33 knots, are expected within 24 hours. The direction may be indicated by a cone or cones below the ball.
10	2	▲ Two red vertically disposed	Winds from the NW quadrant of speed between 34 and 63 knots are expected within 24 hours.
	3	▼ Two white vertically disposed	Winds from the SW quadrant of speed between 34 and 63 knots are expected within 24 hours.
15	4	▲ ▲ Red over white	Winds from the NE quadrant of speed between 34 and 63 knots are expected within 24 hours.
20	5	▼ ▼ White over red	Winds from the SE quadrant of speed between 34 and 63 knots are expected within 24 hours.
	6	■ None	The wind will be blowing from the direction and at the speed indicated by the cones, but will shift within 12 hours in a clockwise manner.
25	7	■ ■ None	The wind will be blowing from the direction and at the speed indicated by the cones, but will shift within 12 hours in an anti-clockwise manner.
30	8	⊕ White, red white vertically disposed	Typhoon winds of unspecified direction speed 64 knots or greater, are expected within 24 hours. This signal may be displayed with another to specify the direction of the wind.

Note :—All these signals may be displayed either singly or in combinations of two or three. When combined, the following order will always be observed from top to bottom :—

* (1) Signal indicating speed of wind. (1, 2, 3, 4, 5, or 8.)

(2) Signal indicating direction of wind. (2, 3, 4, or 5.)

(3) Signal indicating change of direction of wind. (6 or 7.)

40 *It should be noted that signals 2, 3, 4, and 5 indicate both speed and direction.

Japanese storm and weather forecast signals.—The following signals are believed to be still in use in Korea :—

45 *Storm signals.*—Storm signals indicating the direction of the wind and the intensity of the storm are shown, by day and at night, when, within the sea area of a radius of 20 miles from the storm signal station, and generally within 24 hours, the strength of the wind is expected to exceed force 6 of the Beaufort scale.

Day signals are made by means of spheres, cones, cylinders and crosses. Night signals are made by means of coloured lights. All signals are disposed vertically.

The signals and their significance are as follows :—

Winds increasing, force 6 to 7 :—(No signal is made by night.)

5

Note.—All signals have a sphere uppermost.

<i>By day.</i>	<i>Significance.</i>
A sphere above a cylinder.	Wind veering.
A sphere above two cylinders.	Wind backing.
A sphere above a cone, point up.	Wind between W. and N. increasing.
A cone, point up, below a sphere and above a cylinder.	Wind between W. and N. increasing and veering.
A cone, point up, below a sphere and above two cylinders.	Wind between W. and N. increasing and backing.
A sphere above a cone, point down.	Wind between S. and W. increasing.
A cone, point down, below a sphere and above a cylinder.	Wind between S. and W. increasing and veering.
A cone, point down, below a sphere and above two cylinders.	Wind between S. and W. increasing and backing.
A sphere above two cones, points up.	Wind between N. and E. increasing.
Two cones, points up, below a sphere and above a cylinder.	Wind between N. and E. increasing and veering.
Two cones, points up, below a sphere and above two cylinders.	Wind between N. and E. increasing and backing.
A sphere above two cones, points down.	Wind between E. and S. increasing.
Two cones, points down, below a sphere and above a cylinder.	Wind between E. and S. increasing and veering.
Two cones, points down, below a sphere and above two cylinders.	Wind between E. and S. increasing and backing.

Winds increasing, force 8 to 11 :—(Day signals all have a cone uppermost.)

<i>By day.</i>	<i>At night.</i>	<i>Significance.</i>
A cone, point up.	Two <i>red</i> lights.	Wind between W. and N. increasing.
A cone, point up, above a cylinder.	Two <i>red</i> lights.	Wind between W. and N. increasing and veering.
A cone, point up, above two cylinders.	Two <i>red</i> lights.	Wind between W. and N. increasing and backing.
A cone, point down.	Two <i>white</i> lights.	Wind between S. and W. increasing.
A cone, point down, above a cylinder.	Two <i>white</i> lights.	Wind between S. and W. increasing and veering.
A cone, point down, above two cylinders.	Two <i>white</i> lights.	Wind between S. and W. increasing and backing.
Two cones, points up.	A <i>red</i> light above a <i>white</i> light.	Wind between N. and E. increasing.
Two cones, points up, above a cylinder.	A <i>red</i> light above a <i>white</i> light.	Wind between N. and E. increasing and veering.
Two cones, points up, above two cylinders.	A <i>red</i> light above a <i>white</i> light.	Wind between N. and E. increasing and backing.
Two cones, points down.	A <i>white</i> light above a <i>red</i> light.	Wind between E. and S. increasing.
Two cones, points down, above a cylinder.	A <i>white</i> light above a <i>red</i> light.	Wind between E. and S. increasing and veering.
Two cones, points down, above two cylinders.	A <i>white</i> light above a <i>red</i> light.	Wind between E. and S. increasing and backing.

Winds force 12 and over :—(The day signal for a typhoon warning (Force 12 and over) always has a cross uppermost, and the night signal is always a single red light.)

<i>By day.</i>	<i>Significance.</i>
A cross.	Wind force 12 and over.
A cross above a cylinder.	Wind veering.
A cross above two cylinders.	Wind backing.
A cross above a cone, point up.	Wind between W. and N. increasing.
A cone, point up, below a cross and above a cylinder.	Wind between W. and N. increasing and veering.
A cone, point up, below a cross and above two cylinders.	Wind between W. and N. increasing and backing.
A cross above a cone, point down.	Wind between S. and W. increasing.
A cone, point down, below a cross and above a cylinder.	Wind between S. and W. increasing and veering.
A cone, point down, below a cross and above two cylinders.	Wind between S. and W. increasing and backing.
A cross above two cones, points up.	Wind between N. and E. increasing.
Two cones, points up, below a cross and above a cylinder.	Wind between N. and E. increasing and veering.
Two cones, points up, below a cross and above two cylinders.	Wind between N. and E. increasing and backing.
A cross above two cones, points down.	Wind between E. and S. increasing.
Two cones, points down, below a cross and above a cylinder.	Wind between E. and S. increasing and veering.
Two cones, points down, below a cross and above two cylinders.	Wind between E. and S. increasing and backing.

Weather forecast signals.—Flag signals are displayed by day at certain stations to indicate the probable weather for the following day; they will be hauled down at sunset.

The flags with their significations are as follows :—

<i>Flag.</i>	<i>Signification.</i>
Triangular, white.	Northerly winds.
Triangular, white above green, horizontally.	North-easterly winds.
Triangular, green.	Easterly winds.
Triangular, red above green, horizontally.	South-easterly winds.
Triangular, red.	Southerly winds.
Triangular, red above blue, horizontally.	South-westerly winds.
Triangular, blue.	Westerly winds.
Triangular, white above red, horizontally.	North-westerly winds.
Square, white.	Fair weather.
Square, red.	Cloudy.
Square, blue.	Rain.
Square, green.	Snow.
Square, white above red, horizontally.	Clear, occasional cloud.
Square, white above blue, horizontally.	Clear, occasional rain.
Square, white above green, horizontally.	Clear, occasional snow.
Square, red above white, horizontally.	Cloud, occasionally clear.
Square, red above blue, horizontally.	Cloud, occasional rain.
Square, red above green, horizontally.	Cloud, occasional snow.
Square, blue above green, diagonally.	Rain or snow.
Square, white above green and blue, horizontally.	Clear, occasional rain or snow.
Square, red above green and blue, horizontally.	Cloud, occasional rain or snow.
Square, blue and red quarters.	Fog.
Pendant, white.	Becoming cold or cool.
Pendant, red.	Becoming hot or warm.

The signals are made at night by means of *white, orange, blue* and *green* lights. Those exhibited between sunset and 2400 refer to the following day, and those exhibited between 2400 and sunrise refer to the same day.

The signals and their significations are as follows :—

6

<i>Lights.</i>	<i>Signification.</i>
One <i>white</i> .	Fair weather.
One <i>orange</i> .	Cloudy.
One <i>blue</i> .	Rain.
One <i>green</i> .	Snow.
<i>White</i> above <i>orange</i> .	Fair, cloudy later.
<i>Orange</i> above <i>white</i> .	Cloudy, fair later.
<i>Blue</i> above <i>white</i> .	Rain, fair later.
<i>Green</i> above <i>white</i> .	Snow, fair later.
<i>White</i> above <i>blue</i> .	Fair, rain later.
<i>Orange</i> above <i>blue</i> .	Cloudy, rain later.
<i>Blue</i> above <i>orange</i> .	Rain, cloudy later.
<i>Green</i> above <i>orange</i> .	Snow, cloudy later.
<i>White</i> above <i>green</i> .	Fair, snow later.
<i>Orange</i> above <i>green</i> .	Cloudy, snow later.
<i>Blue</i> above <i>green</i> .	Rain, snow later.
<i>Green</i> above <i>blue</i> .	Snow, rain later.

Local special weather signals are made by means of drogues by day, and coloured lights at night. These signals will be shown all day and all night until they are cancelled.

The signals and their significance are as follows :—

<i>By day.</i>	<i>At night.</i>	<i>Signification.</i>
Red drogue.	Two <i>red</i> lights, disposed vertically.	Wind increasing.
Red drogue, blue fly.	A <i>red</i> light above a <i>blue</i> light.	Wind and rain increasing.
Red drogue, green fly.	A <i>red</i> light above a <i>green</i> light.	Wind and snow increasing.
Red cylinder.	Three <i>red</i> lights, disposed vertically.	Rain storm or snow storm.
Blue cylinder.	Three <i>blue</i> lights, disposed vertically.	Heavy rain storm or heavy snow storm.

Signals to be made by vessels when inconvenienced by search- 10
lights.—In the event of the navigation of a vessel being inconvenienced by the glare from searchlights near a port in the British Empire, she should make the signal Z O (— — • — — —) of the International Code of Signals by lamp and by whistle, siren or fog horn.

15

Both the light and sound signals should be employed, whenever possible, and should be repeated until the inconvenience is removed.

Only real urgency should necessitate the use of this signal, as unless the vessel is actually in the rays of a searchlight, it is not possible for the operator to know which projector is affected.

20

This signal is designed to assist mariners ; no liability whatever will be admitted.

This signal should also be used in similar circumstances near ports in other countries.

Signals in Chinese ports.—The undermentioned special signals made by flags of the International Code of Signals, were formerly used at all ports in China, and may be still used at all ports except Ch'ing-tao and Shang-hai.

6	<i>Signal.</i>	<i>Signification.</i>
	Flag G	Doctor wanted.
	Flag G,	Doctor urgently
	over a black ball.	required.

Other special signals in use at various ports will be found in the
10 body of the book under the ports concerned.

BUOYAGE SYSTEMS.—China.—The following system of buoyage is adopted in Chinese waters.

The side of the channel is to be considered starboard, or port, with reference to the entrance to any port from seaward.

15 Buoys coloured red mark the starboard side of the channel.

Buoys coloured black mark the port side of the channel.

Buoys painted in red and black horizontal bands mark the fairway, and should be passed close-to.

Buoys painted in red and black vertical stripes mark the ends of
20 spits, and the outer and inner extremes of banks, shoals, or extensive reefs, where there is a navigable channel on either side of such bank, shoal, or reef. Vessels must not attempt to pass between a buoy thus painted and the danger it marks.

Buoys painted in red and black chequers mark rocks in the open sea,
25 and also obstructions of small extent having channels on either side of them. When marking the latter, they are placed seaward of the danger. Vessels must not attempt to pass between a buoy thus painted and the danger it marks.

When two chequered buoys—red and white, and black and white—
30 mark an obstruction, the red and white buoy marks the starboard side of the channel, and the black and white buoy marks the port side of the channel.

White buoys are used for surveying purposes, and in no way as aids to navigation.

35 Unless otherwise stated all buoys are conical.

All buoys carry the name of their district and station in English and Chinese.

Wreck-marking vessels by night exhibit a *fixed green* light over a *fixed white* light visible all round, and by day fly a green flag.

40 Wreck-marking buoys are painted green, and when lighted exhibit a *green* light.

When a wreck lies in the open sea or in a position where there is plenty of room on either side of it, a wreck-marking vessel or buoy is in every case placed seaward of the wreck.

45 When a wreck lies in a river, harbour, estuary, or confined channel, a wreck-marking vessel or buoy is placed on the channel side of the wreck.

Beacons marking channels and dangers are painted in a similar manner to buoys used for the same purpose.

The rules for painting beacons apply in each case to the body of
50 the structure. When a beacon, painted a single colour, either red or black, is surmounted by a distinguishing mark, such mark may be painted the same colour as the body of the beacon, or with that colour and white combined, or white alone.

When the body of a beacon is painted in two colours, the same
55 colours only are used for the mark surmounting it.

Beacons on land, erected to assist navigation, or to give lines of bearing for crossing bars or entering rivers, harbours &c., are painted so as to make them as conspicuous as possible. Red, black, and white are the only colours used.

Philippine islands.—The system of buoyage in the Philippines is in accordance with the system in the United States of America, as follows :— 6

In approaching a channel from seaward, red buoys with even numbers will be found on the starboard side, and black buoys with odd numbers on the port side. 10

Middle ground buoys will be painted with red and black horizontal bands, and may be passed on either hand ; those conical in shape are recommended to be left on the starboard hand and those can-shaped on the port hand.

Mid-channel buoys will be painted with black and white vertical 15 stripes, and must be passed close-to in order to avoid danger.

Isolated danger buoys will be painted in red and black horizontal bands and may be can-shaped or some other shape.

Perches, with balls, cages, &c., will, when placed on buoys, be at turning points, the colour and number indicating on which side 20 they should be passed.

Different channels in the same bay, sound, river, or harbour will be marked as far as practicable by different descriptions of buoys. Principal channels will be marked by conical buoys ; secondary channels with can buoys ; and minor channels with spar 25 buoys. When there is but one channel, conical buoys properly coloured and numbered are usually placed on the starboard side and can buoys on the port side of it.

Day beacons, stakes, and spindles (except such as are on the sides of channels, which will be coloured like buoys) are constructed and 30 distinguished with special reference to each locality, and particularly with regard to the background upon which they are projected.

In some localities the channels may be marked by " Lazy Vee " beacons which consist of beacons surmounted by the letter " V " with its axis horizontal ; such beacons are arranged in pairs on each 35 side of the channel, the points of the V's being toward the channel.

For vessels entering channels or rivers, *red* lights are on the right or starboard side of a channel and *white* or *green* lights on the left or port side. This is the reverse of the system previously used through- 40 out the Philippines.

Japanese system.—The Japanese system of buoyage, formerly used in Formosa, and believed to be still in use in Korea, is as follows :—

The starboard hand of a channel or fairway shall be understood to be that on the right hand side of the vessel, and the port hand of the same that on the left hand side, when entering from seaward. 45 With regard to shoals and banks, that part further from the entrance is considered to be the upper end, and that nearer to it the lower end.

Buoys.—Black conical buoys, surmounted by a cylinder, and with an odd number painted in white thereon, mark the port side of chan- 50 nels and fairways.

Red conical buoys, surmounted by a triangle, and marked with an even number painted in white thereon, mark the starboard side of channels or fairways.

Conical buoys, painted black and white in horizontal bands, and surmounted by a diamond, mark the lower ends of bars or shoals. 55

Conical buoys, painted red and white in horizontal bands, and

surmounted by triangles, points together, mark the upper ends of bars and shoals.

Conical buoys, painted red and black in horizontal bands, and surmounted by a sphere, mark isolated dangers.

- 6 Conical buoys, painted black and white in vertical stripes, and surmounted by a cylinder, mark the centre of a channel or fairway.

Wreck buoys are green, conical, with a rounded top, and have "Wreck" painted in white letters on them.

- 10 Spar buoys, with a topmark, are occasionally employed, and when used the colour will be specially notified.

Beacons.—Beacons marking dangers on the starboard side of the channel or fairway are painted red.

Beacons marking dangers on the port side of the channel or fairway are painted black.

- 15 Beacons marking the middle of channels are painted black and white in vertical stripes, and are surmounted by a cylinder.

Beacons marking isolated dangers are painted red and black in horizontal bands.

- PILOTAGE.**—Pilot boats of the Chinese Pilotage service were 20 formerly registered, and each boat was furnished with a certificate and a number. The words "Licensed Pilot-boat," with the number, were painted at the stern and on the head of the mainsail; a flag, the upper half of which is yellow and the lower half green, was flown by the pilot boats. It is not known whether these arrangements are 25 still observed.

The signals for a pilot are those laid down in the International Code of Signals.

In 1947, pilotage was compulsory for all vessels, including warships, at all ports in Formosa and at T'ien-ching (Tientsin).

- 30 **LIFE-SAVING.**—Life-boats and life-saving appliances form the principal means adopted for saving life.

- The line-throwing apparatus, the principal life-saving appliance, can often be used with effect when a life-boat is not available; its success, however, depends largely upon an intelligent co-operation 35 on the part of the crew of the stranded vessel.

- Signals.**—In accordance with the International Convention for the Safety of Life at Sea, 1948, Chapter V, Regulation 16, the following signals shall be used by life-saving stations when communicating with ships in distress and by ships in distress when communicating 40 with life-saving stations:—

(a) *Replies from shore station to distress signals made by a ship:—*

Signal

Signification.

By day.—White smoke signal.

By night.—White star rocket.

} "You are seen—assistance will be given as soon as possible."

- 45 (b) *Landing signals for the guidance of small boats bringing away the crew of a wrecked ship:—*

Signal.

Signification.

(i) *By day.*—Vertical motion of a white flag or the arms.

- 50 *By night.*—Vertical motion of a white light or flare. A range (indication of direction) may be given by placing a steady white light or flare lower and in line 55 with the observer.

} "This is the best place to land."

- (ii) *By day*.—Horizontal motion of a white flag or arms extended horizontally. } “Landing here highly dangerous.” 5
By night.—Horizontal motion of a *white* light or flare.
- (iii) *By day*.—Horizontal motion of a white flag, followed by the placing of the white flag in the ground and the carrying of another white flag in the direction to be indicated. } “Landing here highly dangerous. A more favourable location to land is in the direction indicated.” 10
By night.—Horizontal motion of a *white* light or flare, followed by the placing of the *white* light or flare on the ground and the carrying of another *white* light or flare in the direction to be indicated. } 15
- (c) *Signals to be employed in connection with the use of shore life-saving apparatus* :— 20
- | Signal. | Signification. | |
|--|------------------------------------|----|
| (i) <i>By day</i> .—Vertical motion of a white flag or the arms.
<i>By night</i> .—Vertical motion of a <i>white</i> light or flare. | <i>In general</i> :—“Affirmative.” | |
| | <i>Specifically</i> :— | |
| | “Rocket line is held.” | |
| | “Tail block is made fast.” | 25 |
| | “Hawser is made fast.” | |
| (ii) <i>By day</i> .—Horizontal motion of a white flag or arms extended horizontally.
<i>By night</i> .—Horizontal motion of a <i>white</i> light or flare. | “Man is in the breeches buoy.” | |
| | “Haul away.” | |
| | <i>In general</i> :—“Negative.” | 30 |
| | <i>Specifically</i> :— | |
| | “Slack away.” | |
| | “Avast hauling.” | |

AIR LIGHTS.—Mariners are warned that lights (with definite characteristics), which are not ordinary navigational aids, may be exhibited for the use of aircraft from structures near the coasts described in this volume. 35

These lights are often of great luminous power and altitude and may be the first lights or looms of lights sighted when making a land-fall at night ; they normally have the following characteristics :— 40

- (a) *Flashing white* (Revolving beam type).

These lights are usually screened from seaward, but their looms may be visible.

- or (b) *Alternating flashing white and green* (Revolving beam type). 45
 or (c) *Flashing two letter groups* in the Morse Code, in *red* or *green*.

(Although the groups made by these lights may have definite meanings in the International Code of Signals, their signification is to be disregarded ; the fact that they are *red* or *green* in colour, and flash with mechanical regularity, should prevent their being mistaken for signals from shore signal stations or ships.) 50

Air lights which appear likely to be visible from seaward will be shown on charts and described in the Admiralty Lists of Lights. As they are subject to changes of which prompt notification to the

mariner may not always be possible, care should be taken that they are not confused with marine navigational aids.

REGULATIONS.—Quarantine.—China.—The following are extracts from the Quarantine regulations for Shang-hai and other 5 ports of China where the health services are under the control of the Ministry of Health, which were established prior to 1937, but may still be in force.

The Minister may on the recommendation of the Director of Quarantine :—

- 10 (a) Declare that any place within or beyond the Republic of China is infected with a quarantinable disease, or that a quarantinable disease is liable to be brought or carried from or through that place, and thereupon, and for so long as such declaration remains in force, that place shall be a *pro-* 15 *claimed place* within the meaning of these regulations. Public notification of every such declaration shall be made by the issue of a harbour notification and by advertisement in the newspapers.
- 20 (b) Declare any port in the Republic of China to be a first port of entry for vessels coming from a proclaimed place, and require masters of such vessels bound for China to enter such a port before entering any other Chinese ports except in case of danger or for other sufficient reason.
- 25 (c) In consultation with the Harbour Authorities allocate quarantine anchorages for vessels subject to quarantine inspection.

The Minister of Health shall prescribe the limits within a port to be used as a quarantine anchorage.

The master of any vessel subject to quarantine inspection shall, on 30 arrival at a port to which these regulations apply, bring the vessel to the quarantine anchorage.

The hours of quarantine inspection of vessels shall be from sunrise to sunset, and during these hours the quarantine officer shall board every vessel requiring inspection as soon as possible after her arrival. 35 The Quarantine officer may on application inspect any vessel between sunset and sunrise if he is satisfied that the conditions on board, including lighting, will enable such inspection to be effectively performed.

The master of any vessel subject to quarantine inspection shall 40 whenever possible, furnish the Quarantine officer with the following details by wireless at least three hours previous to her arrival at the quarantine anchorage :—

- (a) The name of the vessel and the expected date and hour of arrival.
- 45 (b) The number of passengers and crew on board the vessel, and the number of passengers landing at the port.
- (c) The name of oversea port of departure, and the name of the last port of call.
- (d) The number of cases of infectious disease during the last 15 50 days, or of deaths during the voyage (stating name of diseases).
- (e) The number and nature of any cases of non-infectious disease.
- (f) Whether a medical officer is carried.
- 55 For the purposes of these regulations the quarantinable diseases

shall be plague, cholera, smallpox, typhus fever, yellow fever, and any other disease which may be prescribed by the Minister.

The master of every vessel coming from a proclaimed place shall on arrival furnish to the Quarantine officer as complete a list as possible of all passengers on board, and the full address, where obtainable, of any person who intends to disembark at the port. 5

The following vessels shall be subject to quarantine inspection on arrival :—

- (a) Every vessel which comes from a foreign port, unless exemption has been granted. 10
- (b) Every vessel which comes from a proclaimed place.
- (c) Every vessel which has infectious disease on board, or on board which a death has occurred since the last quarantine inspection.

The master of every vessel subject to quarantine inspection shall display the quarantine signal on his vessel before she comes within 3 miles of the port and until pratique has been granted. 15

The quarantine signal shall be, by day, the hoisting at the foremast head of flag Q of the International Code of Signals, and at night, if in quarantine or if inspection has been arranged, the display of three red lights, disposed vertically, not less than 6 feet (1^m8) apart ; when awaiting inspection three distinct prolonged blasts on the whistle should be repeated at intervals. 20

No unauthorised person shall go on board or alongside any vessel displaying the quarantine signal. 25

Except in case of danger no master of a vessel arriving at any port or place in China to which these regulations apply, and no person on board thereof, shall communicate or attempt to communicate with the shore or with any other vessel, and no person from the shore or from any other vessel shall communicate with such vessel otherwise than by signal until pratique has been granted. 30

A Quarantine officer may, by order in writing, order into quarantine any vessel, person, goods or articles being or likely to be infected with a quarantinable disease. When a vessel is ordered into quarantine the master thereof shall forthwith cause the vessel and all persons and goods on board the vessel to be conveyed to such mooring grounds or to such quarantine station as the Quarantine officer directs. 35

Until a vessel in quarantine is released from quarantine no unauthorised person shall land or unship, or move with intent to land or unship, any goods from the vessel. All persons ordered into quarantine shall perform quarantine, and for that purpose may be detained on board the vessel, or be removed to and detained in a quarantine station. 40

Where a vessel is ordered into quarantine in a port which has not the equipment necessary to receive it, the Quarantine officer may order the master to proceed to another port suitably equipped to carry out the necessary measures of quarantine. 45

Deratisation.—In accordance with Article 17 of the International Sanitary Regulations, deratisation can be carried out and Deratisation Exemption Certificates can be issued to vessels at the following ports in the area covered by this volume :— 50

China : Hsia-men, Shang-hai, Ta-lien (Dairen), Lü-shun (Ryojun).

Formosa : Chi-lung (Keelung), Kao-hsiung (Takao).

SUBMARINE CABLES.—The following articles are taken from the " International Convention for the Protection of Submarine Telegraph Cables of 14th March, 1884 " :— 55

II. It is a punishable offence to break or injure a submarine cable, wilfully or by culpable negligence, in such manner as might interrupt or obstruct telegraphic communication, either wholly or partially, such punishment being without prejudice to any civil action for damages.

This provision does not apply to cases where those who break or injure a cable do so with the lawful object of saving their lives or their ship, after they have taken every necessary precaution to avoid so breaking or injuring the cable.

10 V. Vessels engaged in laying or repairing submarine cables shall conform to the regulations as to signals which have been, or may be, adopted by mutual agreement among the High Contracting Parties, with the view of preventing collisions at sea.

When a ship engaged in repairing a cable exhibits the said signals 15 other vessels which see them, or are able to see them, shall withdraw to or keep beyond a distance of one nautical mile at least from the ship in question, so as not to interfere with her operations.

Fishing gear and nets shall be kept at the same distance.

Nevertheless, fishing vessels which see or are able to see a telegraph- 20 ship exhibiting the said signals, shall be allowed a period of twenty-four hours at most within which to obey the notice so given, during which time they shall not be interfered with in any way.

The operations of the telegraph-ships shall be completed as quickly as possible.

25 VI. Vessels which see, or are able to see, the buoys showing the position of a cable when the latter is being laid, is out of order, or is broken, shall keep beyond a distance of one-quarter of a nautical mile at least from the said buoys.

Fishing nets and gear shall be kept at the same distance.

30 VII. Owners of ships or vessels who can prove that they have sacrificed an anchor, a net, or other fishing gear in order to avoid injuring a submarine cable, shall receive compensation from the owner of the cable.

In order to establish a claim to such compensation, a statement, 35 supported by the evidence of the crew, should, whenever possible, be drawn up immediately after the occurrence; and the master must within twenty-four hours after his return to or next putting into port, make a declaration to the proper authorities.

The latter shall communicate the information to the Consular 40 authorities of the country to which the owner of the cable belongs.

Caution.—Cautionary notes appear on many charts, calling attention to areas in which there are submarine telegraph cables; these areas are indicated by pecked lines on the chart.

Every care should be taken to avoid anchoring in such areas, even 45 though there may be no specific prohibition against doing so, in view of the serious interference with communications which results from damage to submarine cables. Equal care should be taken wherever the symbol for a submarine cable (a wavy line) is shown on the chart.

50 *Danger involved in cutting a submarine cable to clear anchors or fishing gear*:—In the event of any vessel fouling a submarine cable, every effort should be made to clear the anchor or gear by normal methods; should these efforts fail, the anchor or gear should be slipped and abandoned *without attempting to cut the cable*. High 55 voltages are, or may be, fed into certain submarine cables; serious risk exists of loss of life due to electric shock, or at least of severe burns, if

any attempt to cut the cable is made. No claim in respect of injury or damage sustained through such interference with a submarine cable will be entertained.

Compensation for anchors or fishing gear sacrificed in order to avoid injuring a submarine cable can be claimed under the Submarine Telegraph Act of 1885 (Schedule of Submarine Telegraphs Convention, Article VII). 5

MEASURED DISTANCE.—There is a measured distance close eastward of the entrance to Lü-shun chiang (Ryojun kō).

LOCAL MAGNETIC ANOMALIES.—Local magnetic anomalies, 10 have been experienced near the following places :—Hua-p'ing hsü (Kahei sho), Lo-yüan wan (bay), Chi-ming tao, Ch'uja kundo (group), Tokkō kundo (Dokukyo guntō), Kyongch'i do (Keichi tō), and Haiyang tao (Kaiyō tō).

COMMUNICATIONS.—China.—In 1952, there were 14,405 miles of 15 railway in China, but only a few of the principal ports on the eastern coast are connected to the railway system. There is connection with the Korean railway system at An-tung, and there is rail communication with Europe through Siberia.

There is regular steamer communication from the principal ports 20 in China with the principal ports in other parts of the world, and coastal and river services are maintained.

In 1947, there were about 57,000 miles of commercial air routes in China, operated by two Chinese companies. There were no foreign 25 air services.

There are post and telegraph offices at all the principal ports in the area covered by this volume, and they are connected to the general telephone system.

Formosa.—The Government railway runs from Chi-lung to Kao-hsiung; this is the trunk line of the insular railway system, and 30 runs almost the entire length of the western side of the island. On the eastern side of the island there are some smaller railways in places.

There is a telegraph and telephone system in Formosa, and there is direct telegraphic communication with China and Japan.

Korea.—Korea is traversed from south to north by a railway line, 35 which connects with the Chinese railway system at An-tung. There are several branches of this trunk line to ports on the western coast, such as Mokp'o (Mokuho), Kunsan, Inch'ōn, etc. The principal towns are connected to the general telegraph and telephone systems.

Radio stations.—Coastal radio stations in the area covered by 40 this volume, which are open for public correspondence, are established at the following places ;—

China.—Hsia-men (Amoy in List), Shan-t'ou (Swatow in List), Fu-chou (Foochow in List), Yung-chia cheng (Yunkia in List), Yinhsien (Ninghsien in List), Hang-chou (Hangchow in List), Shang-hai, 45 Lao-yao (Lienyun in List), Ch'ing-tao (Tsingtao in List), Wei-hai-wei, Yen-t'ai (Chefoo in List), Taku, T'ien-ching (Tientsin in List), Ch'in-huang-tao (Chinwangtao in List), Hu-lu-tao, Ying-k'ou (Yinkow in List), Ta-lien (Dairen in List), Lü-shun (Port Arthur in List).

Formosa.—Kao-hsiung, Chi-lung, Hua-lien (Hwalien in List). 50

Korea.—Mokp'o, Inch'ōn.

For details of the above stations, *see* List published by the General Secretariat of the International Telecommunication Union.

For details of radio stations which transmit weather bulletins,

storm signals, navigational warnings, time signals, etc., *see* Admiralty List of Radio Signals.

FUEL.—Coal is obtainable at Shan-t'ou, Hsia-men, Ma-wei anchorage, Tan-shui, Chi-lung, Yin-hsien (Ning-po-fu), Shang-hai, Ch'ing-tao, Wei-hai-wei, Yen-t'ai, Lung-k'ou (Lungkow), T'ien-ching, Ch'in-huang-tao, Mokp'o, Kunsan, Inch'ön, Ta-lien, and Lü-shun.

Fuel oil is obtainable at Shan-t'ou, Hsia-men, Ma-wei anchorage, Aparri, Kao-hsiung, Chi-lung, Wen-chou (Wen-chow) port, Yin-hsien, Shang-hai, Ch'ing-tao, Yen-t'ai, T'ien-ching, Mokp'o, Kunsan, Inch'ön, Ta-lien, and Lü-shun.

DOCKS AND REPAIRS.—There are dry docks at Hsia-men, Ma-wei anchorage, Kao-hsiung, Ma-kung chiang (Bakō kō), Chi-lung, Yin-hsien, Shang-hai, Ch'ing-tao, T'ien-ching, Inch'ön, Chinnanp'o, Ta-lien, and Lü-shun.

Large repairs to hull and machinery can be undertaken at Hsia-men, Ma-wei anchorage, Chi-lung, Shang-hai, T'ien-ching, Ta-lien and Lü-shun. Small repairs can be effected at Shan-t'ou, Kao-hsiung, Yin-hsien, Ch'ing-tao, Wei-hai-wei, Yen-t'ai, Ch'in-huang-tao, Mokp'o, Kunsan, Inch'ön, and Chinnanp'o.

BRITISH CONSULAR OFFICERS.—British Consular officers are stationed at the following places:—

China: Shang-hai, T'ien-ching and Peking.

Formosa: Tan-shui, and Tai-pei (Taihoku).

STANDARD AND SUMMER TIMES.—All information regarding Standard and Summer times will be found in the Admiralty List of Radio Signals, Vol. V.

CLIMATE AND WEATHER.—**General remarks.**—Articles 1, 2, 3 and 4 in the General Meteorology section of the preliminary pages are appropriate to this Pilot.

Over most of this region the winters are very cold and the summers very hot, but in Formosa, and to a less extent in the south of Korea, the climate is less extreme; in Formosa and on the adjacent mainland the weather in the coldest months—January and February—is normally warm and spring-like, judged by western European standards. The extreme climate is due to two monsoons: the winter northerly monsoon which is felt from October to May, and the summer monsoon which blows from a southerly direction and is weak and irregular particularly near the coast. The northerly monsoon often blows with gale force from Po hai to Hong Kong, and in general most of the year's gales occur during this monsoon. Although the summer is the quieter season it must not be overlooked that typhoons may occur from May to October.

Most of the region except around Po hai has a large annual rainfall, which averages about 80 inches in Formosa; as a rule summer is the wettest season.

Fog is nearly everywhere most common in spring and summer but, in the south, is infrequent and not markedly seasonal.

Pressure.—(*See* Figures 5 to 10). The distribution of pressure over the area in winter is mainly a result of the semi-permanent Asiatic anticyclone centred at about Lat. 50° N., Long 105° E.; in summer, on the other hand, the low pressure area over south-east China, together with a westward extension of the North Pacific anticyclone, are the main controlling factors.

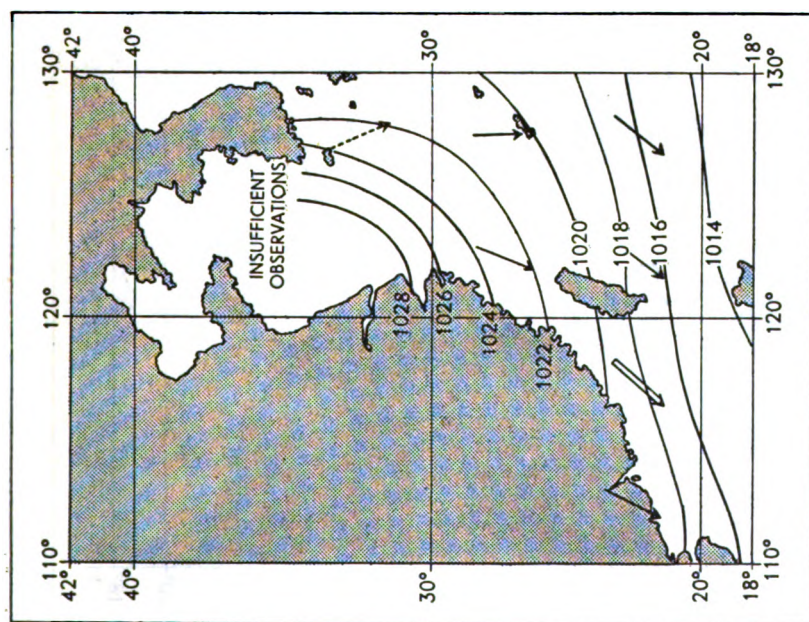


Fig. 5.
Mean pressure and predominant winds—January.

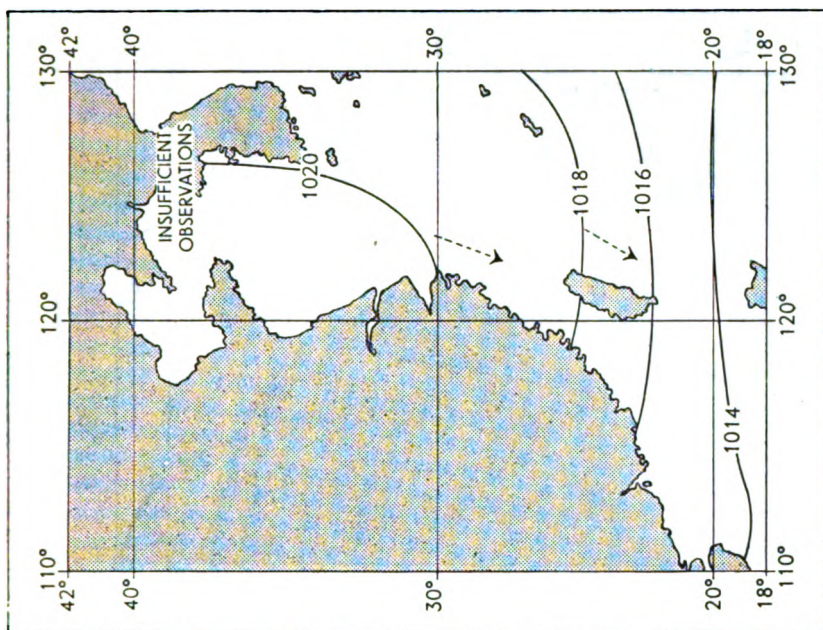


Fig. 6.
Mean pressure and predominant winds—March.

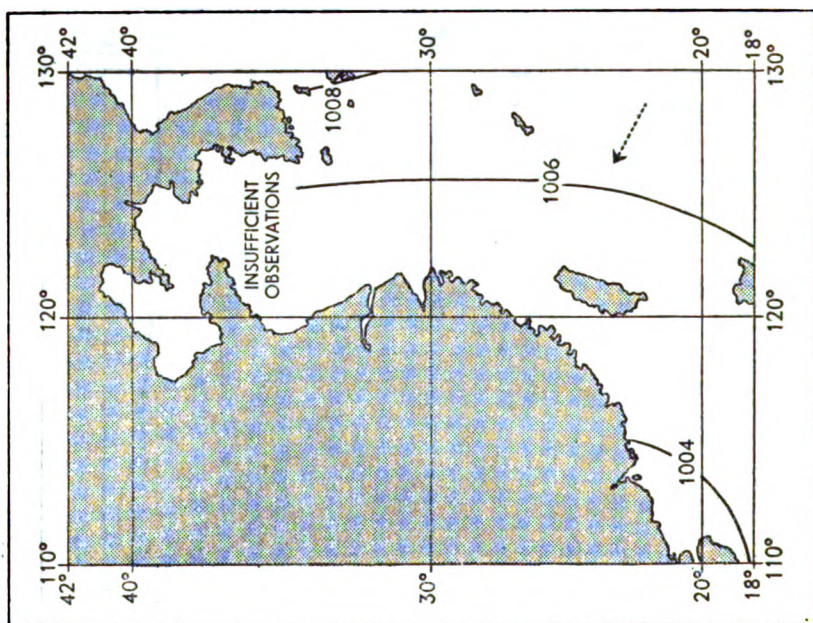


Fig. 8.
Mean pressure and predominant winds—July

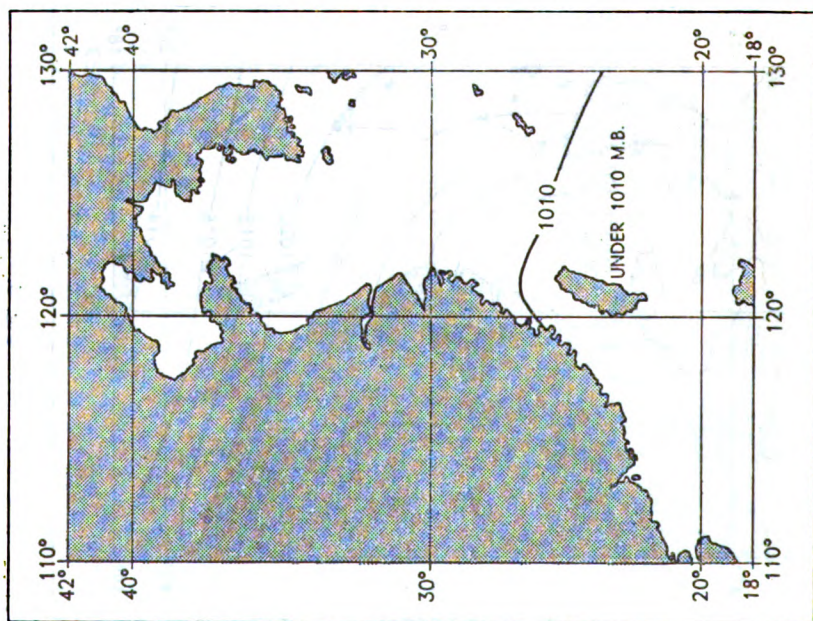


Fig. 7.
Mean pressure—May.

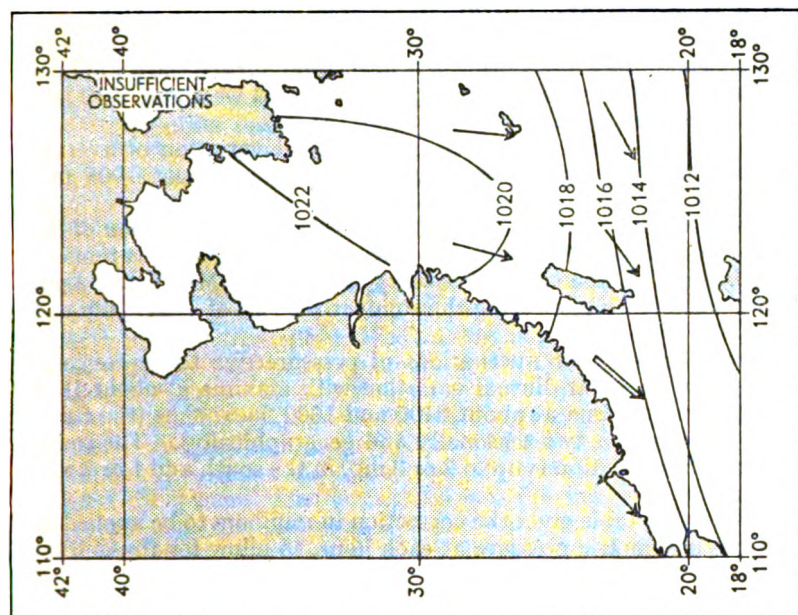


Fig. 10.
Mean pressure and predominant winds—November.

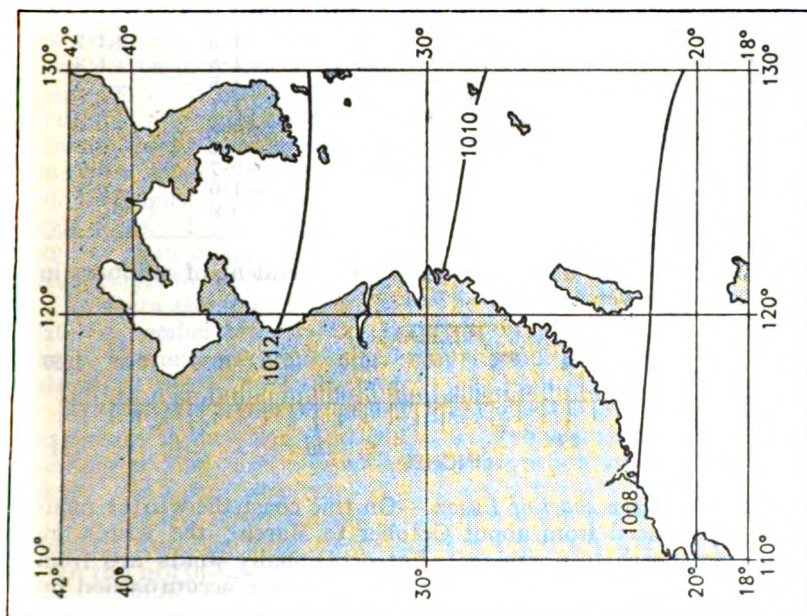


Fig. 9.
Mean pressure—September

In winter the highest pressure along the coast is between Shang-hai and Hai ho ; here the average is about 1030 mb. in January. Southward it falls off to about 1020 mb. at Hsia-men, and northward to 1028 mb. at Ta-lien (lat. 39° N.) and about 1026 mb. on the coast of Korea. The pressure in Formosa is lower than on the coast of China and Korea, averaging 1021 mb. in the north and west and 1019 mb. in the south and east.

In summer there is very little geographical variation of average pressure along the coast ; the July figures show about 1005 mb. throughout.

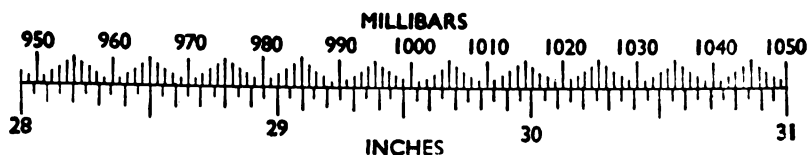
Pressure begins to rise in September owing to the formation of the Asiatic anticyclone, and steadily increases till November. It remains generally high till the end of February, but falls in March and April and remains rather low during the summer months of June, July and August.

Apart from irregular fluctuations of pressure due to depressions, etc., there is a regular diurnal variation with maxima at about 1000 and 2300, and minima at about 0400 and 1600, local time (the times differ by an hour or two seasonally and geographically). The range of this regular variation is up to 2 or 3 mb. in the south and 1 or 2 mb. in the north.

The following table gives the correction in millibars to be applied at sea to the barometric pressure at each hour, to allow for the diurnal variation :

Local time	Lat. 0°-10° N.	Lat. 10°-20° N.	Local time	Lat. 0°-10° N.	Lat. 10°-20° N.
0000	-0.6	-0.5	1200	-0.7	-0.5
0100	-0.1	-0.1	1300	0.0	+0.1
0200	+0.4	+0.4	1400	+0.7	+0.7
0300	+0.7	+0.7	1500	+1.3	+1.2
0400	+0.8	+0.7	1600	+1.5	+1.3
0500	+0.7	+0.5	1700	+1.5	+1.2
0600	+0.2	+0.1	1800	+1.1	+0.9
0700	-0.3	-0.4	1900	+0.5	+0.3
0800	-0.9	-0.8	2000	-0.2	-0.2
0900	-1.3	-1.2	2100	-0.7	-0.7
1000	-1.4	-1.2	2200	-1.0	-0.9
1100	-1.2	-1.0	2300	-0.9	-0.8

The accompanying diagram shows the equivalent of millibars in inches, and vice versa.



Winds.—*Northern coast of Luzon.*—On this coast the winter monsoon is experienced from about October to March ; the winds are mainly from north to north-east, but occasionally winds are from north-west, when they are stronger, and are often accompanied by cloudy weather and rain. In April, land and sea breezes are well marked, and from June to September southerly winds prevail. Squalls, accompanied by thunder and lightning, are frequent in summer.

Formosa.—The winter monsoon blows from October to April and winds are mainly north-easterly. Their average force is considerable, especially in the north and east, where it may reach force 8 to 9 for days on end in December.

In summer, from about June to August, a south to south-west monsoon wind is the most frequent in the north, but the wind often blows from other directions and calm days are not uncommon. In the south the wind is even more variable.

Coast of China southward of Shan-tung kao-chiao. The winds are those of the northerly monsoon in winter from September until March, but there is a slight variation in the most frequent direction along the coast. South-westward of Fu-chou winds are usually north-easterly, with occasional winds of gale force. On this part of the coast the monsoon is often northerly from 0200 to 1000 and easterly from 1000 to 0200. Further northward, at Yung-chia-cheng, north-westerly winds are most frequent; the winter monsoon is shorter in duration here, lasting only from October to February or March. Wind direction northward of Yung-chia-cheng becomes more northerly, and at Ta-ch'i shan (Gutzlaff island) the winter monsoon is north-north-westerly and lasts over the entire life of the central Asian anticyclone. Further northward, the monsoon again backs westward and the prevalent direction at Shan-tung kao-chiao is north-westerly; this direction is especially marked in December and January, though the monsoon extends from September to March. Gales are frequent.

The summer monsoon in the southern part of China lasts from June to early September, and at Lien-hua-feng chiao storms and gales are very rare in this part of the year; the prevalent wind direction is south-westerly. At Hsia-men, however, the most frequent direction is south-south-easterly; winds are uncertain however, and both gales and calm days are rather more frequent. Yung-chia-cheng has a long season of southerly winds, lasting from March to the middle of September; it is not well marked, however, as the wind direction is variable, and calm days are very frequent throughout this period. Ta-ch'i shan, although its season is shorter, has a much more defined monsoon season, lasting from May or often April, to July, and generally to August. Winds are from south or east, and occasionally reach gale force. The direction of the monsoon veers further northward, and at Shan-tung kao-chiao the monsoon direction is south-westerly from April to August. Calm days in this part are few.

Northern shores of Yellow Sea.—The winter monsoon prevails from late September or early October to February or March; it brings many storms, especially in December and January, and averages about 12 knots at Wei-hai-wei.

The summer monsoon prevails from about April to August; it is uncertain in direction, and calms are frequent, but at Wei-hai-wei southerly winds are more common than other winds from April to July. Gales are very rare.

Sea Areas:—Over the sea areas the monsoons are more precisely marked and the force of the wind is decidedly greater.

In the north-eastern part of the China sea, winds are north-easterly from September until May, except that in April easterly winds predominate in Luzon strait. June and July show the summer monsoon effect with south-westerly winds but in the channel between Luzon and Formosa winds are very variable in direction.

In Formosa strait, from October to April, winds from north-east

prevail occasionally backing to north. During these months, the average velocity exceeds 25 knots (except in April when the winds are a little less constant), and maximum speeds of more than 60 knots have been recorded. From June to August southerly winds prevail, though south-westerly winds are quite common.

In Eastern sea, winds are northerly from September to April, north-easterly from September to November, and from almost due north from January to March. The summer months show the effect of the monsoon, the wind direction in May being south-easterly, and from June to August southerly; in August easterly winds are frequent.

In Yellow sea, the winter monsoon results in a fairly steady north-westerly direction from September to March. During December and January the wind is almost invariably from this direction. The winds bring overcast weather and frequently rain, whilst long-lasting gales from north-north-west are always likely. In the north-western area of the sea, the winds in winter are rather more northerly in direction. In summer, the general direction is southerly, being south-easterly near Ch'ing-tao, and south-westerly near the Korean coast; these conditions prevail from April to July. Winds in August are uncertain in direction. Strong winds are rare in summer except when associated with typhoons and squalls or thunderstorms, which occur occasionally during these months.

The approaches to Yalu ch'iang are under the influence of the winter monsoon from September to March; in September the winds are mainly northerly or north-easterly; from October to March the prevalent direction is north-westerly. These winds are cold and dry and are frequently of gale force especially in late winter and early spring. From April to August south-westerly winds prevail, but, particularly in August, wind direction is uncertain.

In Po hai and Liao-tung wan winds are from north or north-east from September to March and from south-west from April to July. Southerly winds of any strength can be expected to veer to north-west or north and blow hard for many hours. The most common time for these changes is in autumn and they can extend to the extreme northern part of Yellow sea. Again, August is a transitional month, with many days of calm and easterly winds in the south, and very variable winds in the north.

Figures, 5, 6, 8, and 10 show the predominant winds in January, March, July, and November, respectively.

The arrows show the direction of the predominant wind, if its constancy is at least 51% according to the following scheme:—

-----> 51-60% ———> 61-80% =====> 81-100%

Predominance is judged in relation to that quadrant (90°), not necessarily bounded by the four cardinal points, which shows the greatest number of winds. Only winds of force 3 or more are taken into account in estimating predominance. The arrow shows the direction bisecting the quadrant, and the constancy is defined as the percentage relation between the number of winds from that quadrant, of forces 3-12, and the total number of winds observed from all directions (including forces 0-2).

Gales.—(See Figures 11 and 12). *Formosa*.—The number of gales experienced annually varies greatly in different parts of Formosa; gales are more common in the south than in the north especially near Heng-ch'un (Kōshun). Few gales occur during summer except in association with typhoons. Gales in Formosa strait are far more

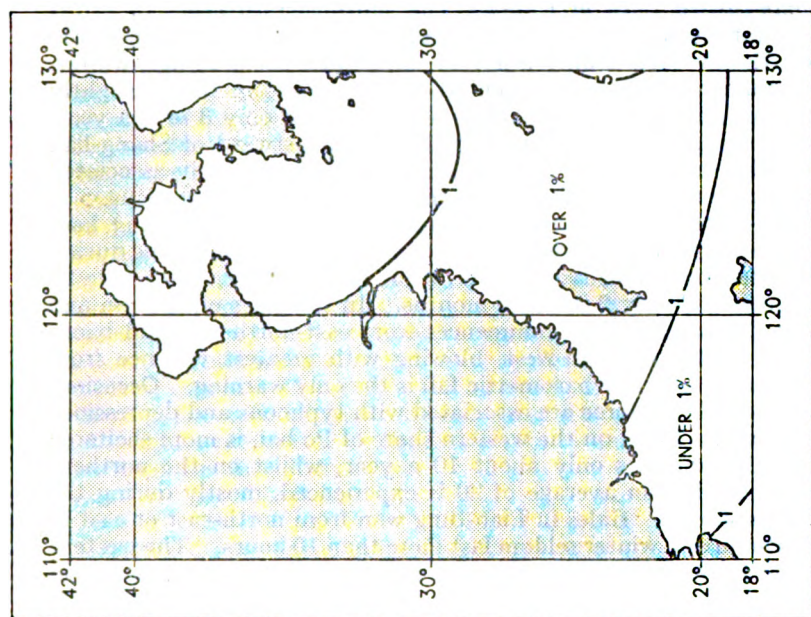


Fig. 12.
Percentage frequency of gales (Beaufort force 7 and over)—
June.

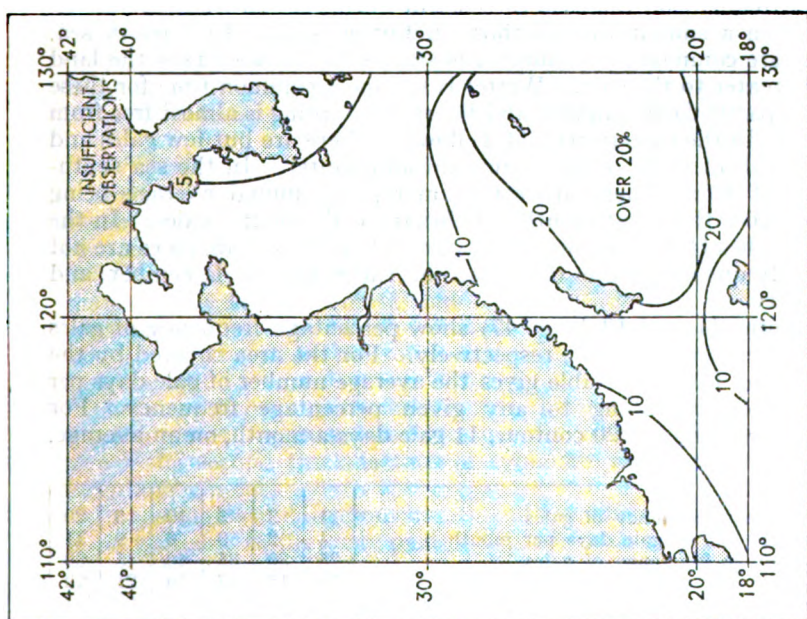


Fig. 11.
Percentage frequency of gales (Beaufort force 7 and over)—
December.

numerous, most of them being experienced in the early part of the winter monsoon period.

South-eastern coast of China.—The south-eastern coast of China suffers far less from gales than Formosa ; at Hsia-men, a sheltered place, the average is only 3 a year, and these occur in late winter. The number of gales experienced on the coast increases slightly northward, though Shang-hai has an average of only 3 or 4 a year. Ta-ch'i shan, situated about 45 miles south-eastward of Shang-hai, gets rather more gales ; summer gales here are generally associated with typhoons or occasionally with extra-tropical depressions.

North-eastern coast of China.—In the vicinity of Shan-tung kao-chiao there are many more gale days a year, nearly all occurring during the winter monsoon ; at Yen-t'ai, from 1928 to 1932, there were 21 such gales and only 2 in other months. In the gales of autumn and winter the wind usually commences from east-north-east and backs through north to north-west, blowing with greatest violence from northward ; a steady barometric fall is the only warning. Occasionally winds of gale force are associated with typhoons and depressions hereabouts. Taku, on the western shore of Po hai, is more sheltered from gales and has only about 10 a year, whilst on the northern shore of Po hai an average of 20 is experienced, mostly during the winter monsoon. Gales in Liao-tung wan from north-east or east in the autumn and winter seldom last more than 10 hours. The western coast of Korea experiences about 10 days with gales a year, mainly in winter.

Sea Areas.—Gales at sea are more numerous than those on land. In Luzon strait there are usually from 15 to 20 a year, many of which are in September, October and November, during the early winter monsoon season. Few are experienced in spring. Gales are rather more frequent off the eastern coast of Formosa and these are distributed in a similar way to those in Luzon strait. In Eastern sea, gales are common ; the number is smaller to the west near the land and greater to the east. Winter is the most common time for these gales, particularly January and February ; spring is almost free from gales. In the eastern part of Yellow sea there are but few gales and nearly all of these occur in autumn and winter. In the sea southward of Korea there are rather more, the annual average being about 20 ; the worst month is February with about 5 gales. In the approaches to Yalu chiang, Po hai, and Liao-tung wan, gales are not very frequent ; more than half of these fall in December and January.

Figures 11 and 12 (page 47) show percentage frequency of gales for December and June, respectively. For the area covered by the chart, the following table gives the average number of gale days per month corresponding to any given percentage frequency. For example, along the 20 contour, 11 gale days a month, on an average, may be expected.

Percentage frequency of gales	1	3	5	10	15	20
Average No. of gale days per month	$\frac{1}{2}$	2	3	6	9	11
Percentage frequency of gales	25	30	35	40	45	50
Average No. of gale days per month	13	15	17	19	21	22

Typhoons.—*General remarks* :—(See also standard article on page xl). The name "typhoon" is given to the fierce tropical cyclonic depressions experienced in the North Pacific ocean and the seas off

the eastern side of Asia as far north as Japan. Winds in such a system blow round the central low, in accordance with Buys Ballot's Law, in an anti-clockwise direction. The centre, or the "eye of the storm," is a region of light winds or even of calm. Winds immediately outside the centre are of hurricane force and the velocities reached have been so great that estimation has been difficult; velocities of over 100 knots have often occurred. The whole system has a motion of progression. It is often difficult to say whether the term "typhoon" should be applied to any particular disturbance, as the centre may not pass sufficiently close to an observer for him to experience winds of hurricane force. Frequently a disturbance, which starts as a depression, suddenly acquires typhoon characteristics. For these reasons, all cyclonic disturbances in the tropics hereabouts, are classified as typhoons, with the qualification in doubtful cases of "intensity unknown." Probably 50 per cent. of such disturbances develop into typhoons; some authorities, however, consider 25 per cent. to be much nearer the mark.

Most typhoons originate eastward of the Philippine islands; there is an annual movement of the mean latitude of the zone of origin. The mean for the different months is:—

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
8° 00'	7° 00'	6° 30'	8° 50'	13° 20'	14° 55'	15° 00'	16° 05'	14° 40'	11° 30'	10° 10'	8° 30'

There is also a longitudinal swing, the mean longitude of the zone of origin varying from about 160° E. in January to 140° E. in June. The main season when typhoons are experienced in the area considered in this volume is from about May to October, so that the average zone of origin for this time is about in latitude 15° N. and longitude 130° E.

Frequency and Period.—The number of typhoons experienced over the western side of the North Pacific is about 23 a year; this number is subject to considerable variation and typhoons recorded in individual years range from 11 to 38. The average number experienced in the area covered by this volume is from 10 to 15 annually. With 12 as the average, the monthly distribution is approximately:

No. of typhoons a year	May	June	July	Aug.	Sept.	Oct.
	.7	.8	3.0	2.9	2.3	1.0

Typhoons are much less frequent in the north and generally are of less intensity, though occasional typhoons of great violence have been experienced in Korea.

In March and April there is a possibility of a typhoon in Balintang channel. In May, Formosa and Balintang channel are liable to typhoons. In June, Shan-hai and the latitudes southward of that place, as well as the south-western part of Korea, are in the danger zone.

There are two main tracks: across the northern part of Luzon travelling north-westward and crossing the coast southward of Hsiamen; the second track is that of typhoons which recurve in the Balintang channel.

July is the most dangerous month and the whole area is then liable to be visited. In the early part of the month there is a well-defined track of typhoons travelling north-westward, passing across Formosa. During the rest of the month there is no specially marked track; the south-eastern coast of China experiences on an average about one typhoon a year. Balintang channel is a real danger area whilst Korea is only visited in occasional years.

During August typhoons may occur over the whole area, except that

the area lying north-westward of a line joining Shan-tung kao-chiao and Inch'ön is free towards the end of the month. Again there is an average of about one typhoon a year in this month on the south-eastern coast of China; a typhoon in Balintang channel is also
5 experienced in most years.

In the beginning of September, the danger area is the vicinity of Shang-hai and to southward, together with the south-western part of Korea; but by the end of the month only Formosa and the area southward of Fu-chou are liable to typhoons. At this time of
10 the year typhoons average about one every other year in Formosa, as well as on the south-eastern coast of China and in Balintang channel. Typhoons occasionally visit Korea during this month.

Later than September, the only danger area lies southward of Hsia-men. In November, typhoons even in Balintang channel are
15 very rare.

Tracks.—(See Figure 13). The usual track of a typhoon is west-north-westward after birth, and a continuation in this direction until it "recurves," after which it proceeds in a north-easterly direction. Recurving usually takes place at about latitude 25° N. There is,
20 however, a movement northwards of the mean zone of recurving from January to July and a return southward again from August. The velocity of progression before recurving is about $11\frac{1}{2}$ knots between

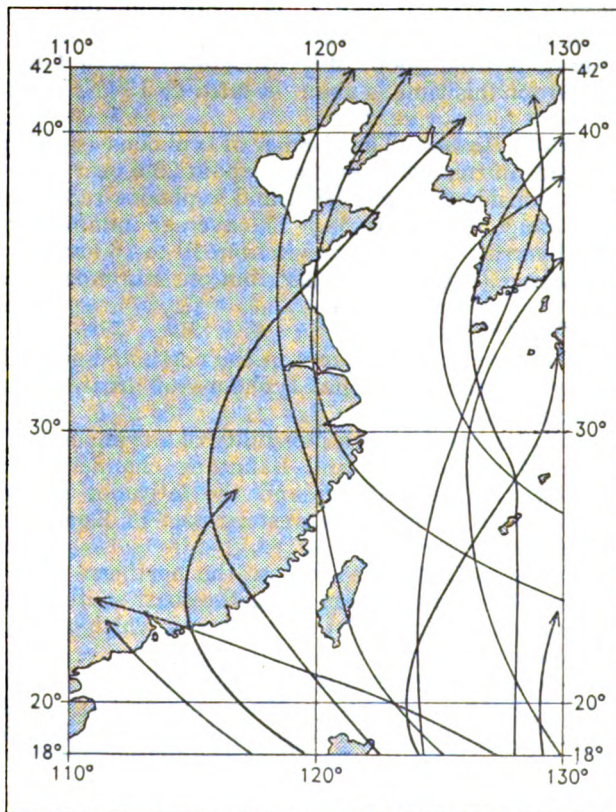


Fig. 13.
Typical typhoon tracks—July.

the latitudes of 25° and 35° N.; about 70 per cent. of the typhoons have a velocity within 2 knots of this figure. There is usually a marked decrease in speed before the recurving takes place, but after the storm has started to move north-eastward the velocity is higher than before and 20 knots is the average; the speed of advance is much more variable at this stage than before recurving, and velocities of from 25 to 30 knots are not uncommon. The maximum speeds recorded have been 24 knots (before recurving) and 52 knots in Japanese waters (after recurving). 5

It should be realised that the above rules about recurving of typhoons are not universally true; thus a storm can recurve with no loss in speed, and conversely a storm can slow down appreciably and not recurve. Very curious tracks are occasionally described. Some typhoons have described a complete circle, thus visiting the same place twice; whilst others have been known to recurve south-westward. 15 A typhoon can remain stationary for a considerable time.

The following rules have been formulated with reference to the movement of typhoons:—

1. Typhoons tend to move parallel to the isobars which lie outside the storm itself. 20

2. Typhoons will avoid a stationary anticyclone by passing round it one way or the other.

3. If an anticyclone advances towards a typhoon, the latter will generally either turn away from the advancing high pressure area, or will cease to move. 25

4. Typhoons tend to follow in the wake of a retreating anticyclone and, under these circumstances, they may move across the isobars.

The above four rules hold for about 75 per cent. of recorded cases but have failed in varying degree in about 25 per cent. A typhoon is more likely to avoid an anticyclone which is increasing in intensity than one which is decreasing, and it may even elect to move towards the latter. 30

It is sometimes stated that tropical cyclones move so as to keep an area of high pressure on their right. This is often not the case; but, nevertheless, this rule generally holds in the case of semi-permanent oceanic highs. 35

Warnings.—*Swell.*—Provided there is no land between the ship and the typhoon centre, the swell probably gives the first indication of the approach of the typhoon. The swell moves straight outwards from the centre and may be perceptible 1,000 miles or more from the centre. It is in any case nearly always felt at 400 miles. At distances greater than 200 miles, this is the most reliable indication of the bearing of the centre. Any change in the direction of swell is a useful guide to the track of the typhoon. 40

Barometer.—This cannot be relied upon to give adequate warning but its readings may be of value when considered with other portents. 45 Between the latitudes of 25° and 35° N. other disturbances such as depressions over Ch'ang chiang valley affect pressure readings over considerable areas but such depressions may not develop into typhoons. Moreover, the barometer warning is often too late to be of much service. Again, unsteadiness is generally believed to be an indication of the approach of a typhoon, but similar unsteadiness is often associated with tropical thunderstorms and summer squalls. 50

In the absence of any such disturbances, with the typhoon centre passing near to the observer, there are usually three phases of the change in pressure; these are more often distinguishable in the southern than in the northern part of the area. 55

1. A slow fall in which the diurnal variation can, however, easily be detected, usually at from 500 to 120 miles from the centre.

2. A quicker fall in which the diurnal variation is less easily detected, usually from 120 to 60 miles from the centre. Throughout this stage the barometer is very unsteady.

3. A rapid fall, usually from 60 to 10 miles from the centre.

It is not uncommon for the barometer at the centre to stand 60-70 mb. lower than in the region just outside the storm field. A very low pressure in the central area is frequently associated with a very strong circulation of wind, but this is by no means always the case. In fact the typhoon of August 1st, 1931, although one of the worst ever experienced at Hong Kong, had a minimum recorded pressure of 993 mb., and pressure was probably not much lower than this at the centre, which was not far away from the place where the minimum of 993 mb. was observed.

In the rear of a typhoon the pressure rises as quickly as it had fallen in front of the centre.

Wind.—Generally speaking, winds as strong as Beaufort force 8 are not felt beyond 400 miles from the centre of a typhoon in tropical latitudes, and beyond 700 miles in higher latitudes; south of about latitude 20° N. winds of more than force 8 are usually first noticed at distances of less than 100 miles from the centre. The isobars of a typical typhoon are more or less circular. The surface winds blow anti-clockwise around the low pressure area with a convergence towards the centre of 30°. This means that if an observer faces the wind the typhoon centre will bear approximately 120° on his right hand side. Individual storms vary and at the best the method only gives a rough bearing of the centre.

It is sometimes stated that the angle of convergence decreases with decreasing distance from the centre of the typhoon. Although this may be true to a certain extent towards the outer limit of the typhoon area, it does not hold good with the storm field proper of typhoons in this area. On the whole it is best to assume a standard convergence of 30°.

The wind direction should be carefully watched, as a permanent change in the direction will indicate a change in the position of the typhoon centre relative to the observer. If the wind remains steady in direction whilst increasing greatly in force, the centre will pass close to the observer. On an average the following forces are experienced in different parts of the typhoon; force 12 at 35 miles from the centre, force 11 at 50 miles and force 6 at from 150 to 200 miles. Deceitful lulls sometimes occur that can possibly be mistaken for the central calm. The maximum wind force is experienced just before the central calm and comes as a terrific squall.

The average diameter of the centre of a typhoon increases with increasing latitude; it is approximately 30 miles at about 30° N., and it takes from one to two hours to pass over a stationary observer. But individual storms can differ widely from these averages. Mountainous cross seas run in the centre, which are a greater danger to shipping than the squalls in the body of the storm.

After the centre has passed, there is a terrific squall from the direction opposite to that of the last violent squall before the centre; the wind velocity decreases as the storm recedes until finally normal conditions return. If the centre does not pass over the observer, no calm period will of course be experienced neither will any sudden violent change in wind direction normally be observed.

From 100 to 150 miles from the centre, continuous rain usually sets in which soon becomes torrential. Heavy rainfall is associated with all typhoons and visibility is in consequence greatly affected ; at sea visibility is frequently less than a cable due to the rainfall. When the eye of the storm arrives, the rain generally ceases completely, and the sky becomes brighter, and a thin broken layer of alto-stratus (through which the sun or moon is visible) replaces the dark pall. The temperature often rises. As the centre passes, the sky again becomes overcast, and rain sets in ; this is just as heavy, but not so long-lived as that which preceded the centre. The greatest rainfall ever recorded during the passing of a typhoon was 46 inches at Baguio city, in the middle of Luzon ; falls are not quite so heavy in latitude northward of 25° N., but 20 inches is often experienced. Only very rarely are thunder and lightning noticed during the passing of a typhoon.

Cloud.—Cirroform clouds generally precede a typhoon ; it does not necessarily signify that a typhoon is approaching if cirrus clouds are seen, but conditions should be carefully watched. This warning is not so valuable in the Yellow sea area as in the tropics, as cirro-form clouds are also associated with depressions in that region. The cirrus clouds usually travel in the direction of the progression of the centre, but the sky is generally too overcast for this to be of much service.

Such clouds often give rise to beautiful and lurid sunrises and sunsets with a fiery copper-coloured sky, but any or all the colours of the rainbow may be visible. Such displays are not always associated with a typhoon.

Fracto-cumulus clouds (known as "scud") often appear before a typhoon. These look like rags of black cloth drifting just above the horizon and may be present in an otherwise cloudless sky. As the typhoon approaches, the ragged clouds become more numerous and banks of clouds appear above the scud, which, as time passes, coalesce into a single sheet of nimbo-stratus with fracto-nimbus below. The low cloud area extends from 200 to 250 miles from the centre of the typhoon, but individual storms differ a good deal in this respect.

Recorded accounts of typhoons.—The following descriptions are of four typhoons recorded during this century.

The "de Witte" storm occurred from the 1st to the 16th of August, 1901. It was one of the most violent typhoons ever experienced on the Chinese coast ; it approached China travelling west-north-westward, and struck the coast between Fu-chou and Yung-chia-cheng on the night of August 1st-2nd. It travelled in a great curve through Fukien, and across the province of Chekiang, and continued north-north-westward into Mongolia, a very abnormal path. On the coast, a minimum pressure of 915 mbs. was registered. The storm was so called, of course, due to the destruction by it of the 2,000-ton Russian steamer *de Witte* which, although almost new, and thoroughly seaworthy, was totally destroyed.

An aberrant typhoon was observed in the Pacific lasting from August 10th to the 16th, 1924. This was first observed in the western Pacific, near the Marianas islands, on August 5th, and was remarkable for the track which it followed. The majority of the disturbances travel north-westward or even westward until they stroke the mainland of Asia, when they fill up, or recurve to a northerly or north-easterly direction. This typhoon, fully developed and violent, followed a looped track south-westward of Japan, travelling south-

westward on August 10th, southward and south-eastward on August 11th, and moved very slowly eastward from August 12th to the 16th. Finally on August 17th it resumed its normal track, and continued across the Sea of Japan. So unusual was the track that a steamer was wrecked because its captain, thinking a typhoon could not possibly advance south-westward, neglected to take precautions.

The Shan-t'ou typhoon, between August 2nd-3rd, 1922, was one of the worst in the history of the China seas. It was first observed as a disturbance near the Caroline islands on July 27th, moving west-north-west and increasing in intensity. On July 31st, the typhoon passed over Luzon, when it turned northwards, and passed directly over Shan-t'ou on the night of August 2nd-3rd. A barometric reading of 938 mb. was registered, the wind was violent and the rain torrential. Shipping suffered greatly, several steamers being washed ashore, and 75 per cent. of the fishing fleet was wrecked beyond hope, but the greatest damage was due to an enormous wave which swept away all remaining houses. 50,000 out of a population of 65,000 were estimated to have lost their lives. The height of the water after the typhoon was at one time 12 feet (3^m7) above the normal high water level, and it was several days before the excess drained away.

A violent typhoon passed over Hong Kong on August 18th, 1923; the centre itself was but 14 miles from the town. The diameter of the centre was about 7 miles, outside which winds had velocities greater than 90 knots; one gust was recorded of 110 knots.

25 Typhoon harbours.—The following anchorages, within the area described in this volume, are available in a typhoon:—Shan-t'ou; Ch'ang-shan po-ti; Tung-shan chiang (Tongsang harbour); Hsiamen chiang; Chin-men chiang; Tan-shui chiang and Chi-lung chiang in Formosa; Hsing-hua wan (Hunghwa sound); Hai-t'an hsia, southern entrance; Lo-yüan wan (bay); San-tu ao (inlet); Feng-huo shan (Angle island), Little pass (for a single vessel); Nan-kuan chiang (Namkwan harbour); Pei-kuan chiang (Pikwan harbour); Hei-niu wan; Lo-ch'ing wan; T'ai-chou lieh-tao (Tai-chau islands); Hsiang-shan chiang (Nimrod sound).

35 In Chou-shan ch'ün-tao: Ting-hai chiang (harbour), outer and inner anchorages; Ch'ang-t'u chiang (Chang-tau harbour); Shen-chia-men (Sinkeamun) harbour (for small vessels); Tao-ch'u chiang (Ta-utze harbour) (for small vessels). In the southern approach to Ch'ang chiang: the northern side of Ch'ü shan (Tsu san).

40 Extra-tropical cyclones.—Extra-tropical depressions (Continental depressions) are experienced in winter and early spring in latitudes northward of 25° N. On the approach of such a depression the surface wind first veers from south-east to south-west, and later to west or even north-west, blowing harder as the cold front arrives (see **45** standard article on Lows, page xxxviii). Near the cold front, thunderstorms may be expected during the summer, but are rare in winter. There is little information as to whether these continental depressions travel far out to sea. The arrival of the squall line is followed by a violent onrush of cold air, with showers, and in winter in North China **50** and Shan-tung kao-chiao by snowstorms and blizzards. In Ch'ang chiang valley, these storms are infrequent and never occur in the first half of winter; snow is sometimes experienced in November, however. In spring and early summer there is more fog and thunder than in winter but the winds are not so violent. The rain in front of **55** these depressions is more continuous in summer than in winter and spring.

Temperature.—The average temperature for the whole year is much lower in the northern part of the area covered by this volume than in the southern part, and this difference is mainly due to the much colder winter in the north, and not to lack of summer heat.

The seasonal course of temperature near the coast in the different parts of the area is very roughly indicated in the following four sections. More exact indications, for particular places, are given in the climatic tables on pages 64 to 79.

Winter (October to March or April).—There is little or no frost southward of about Lat. 26° N., but further northward severe frosts occur at night, especially on the northern shores of Yellow sea, where there are periods of continuous frost lasting many days on end.

On islands and exposed headlands temperature is not so low as in sheltered or land-locked regions, but the stronger winds make the cold more unpleasant.

In January the average temperature at Aparri, in the north of Luzon, is about 70° F. and in Formosa 60°. On the mainland southward of Shang-hai it is between 50° and 60°, at Shang-hai about 40°, and on the northern shores of Po hai and the approaches to Yalu chiang for the most part well below 30°, and at Ying-k'ou (Lat. 41°) below 15°. In South Korea on the other hand the January average is slightly above the freezing point.

Spring.—This is a season to which no precise months can be assigned; it consists mainly of spells of summer heat and sudden wintry set-backs. In the estuaries of the rivers that enter the northern parts of Yellow sea, however, the break up of river ice is normally the last phase of spring.

Summer.—Southward of about latitude 26° N. summer may be taken to cover the period May or June to September, and in the north extends roughly from June to August. The warmest months are July and August. In August the mean temperature is between 75° F. and 80° on the shores of Po hai and the approaches to Yalu chiang, and 80° to 85° further southward.

Autumn.—This season is rather similar to spring in that it is a transitional period to which no precise time can be assigned. In some years there is not much weather in September that can be regarded as summer weather, but spells with warm sunny days in October may yet raise temperature to a summer level. The mean for these two months is nearly 80° at Aparri and between 55° and 60° at Ying-k'ou.

Sea Temperatures.—Mean sea temperatures for the months of February, May, August, and November are shown on figures 14 to 17.

In the diagrams, the areas in which the mean sea temperature exceeds the mean air temperature by 3°F. or more are indicated by horizontal shading, and those in which the mean air temperature exceeds the mean sea temperature by 3°F. or more, by vertical shading.

Humidity.—The extreme south of the region is considerably damper, averaged over the whole year, than are the coasts northward of latitude 30°, and this is mainly because in winter the extreme south hardly ever gets the very dry winds that are then so common in the north. The annual average relative humidity is as high as 85 per cent. at Chi-lung (northern Formosa), but only 60 per cent. at Ch'ing-tao.

In winter, the south-eastern part of Formosa has an average of 75 per cent. and the north-western part about 84 per cent. The coast

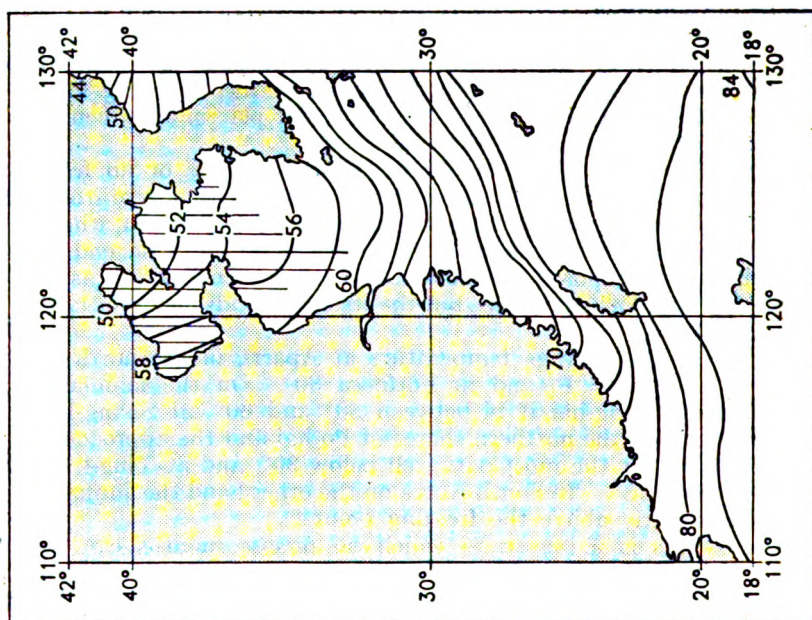


Fig. 15.
Mean sea temperature—May.

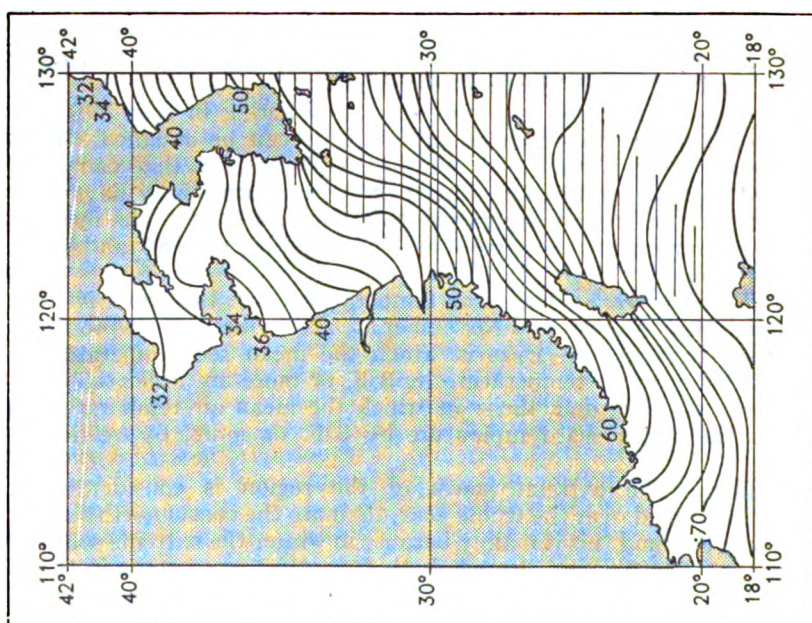


Fig. 14.
Mean sea temperature—February.

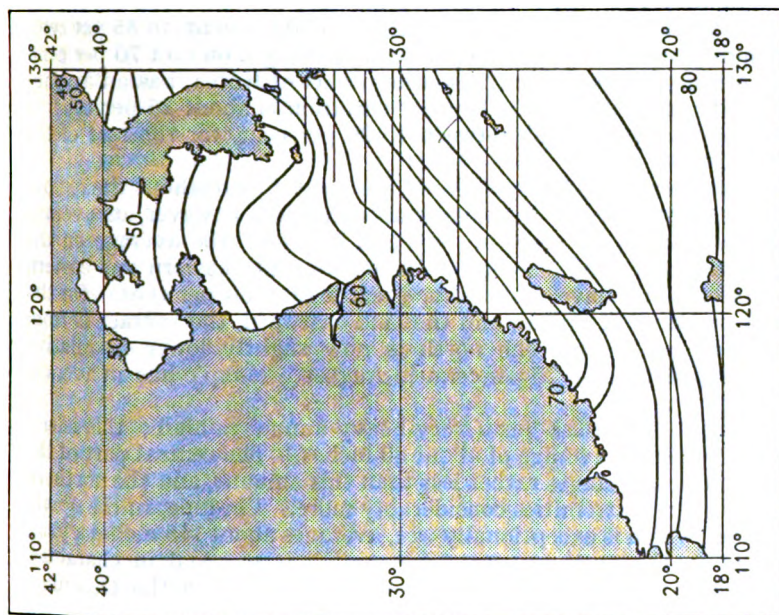


Fig. 17.
Mean sea temperature—November.

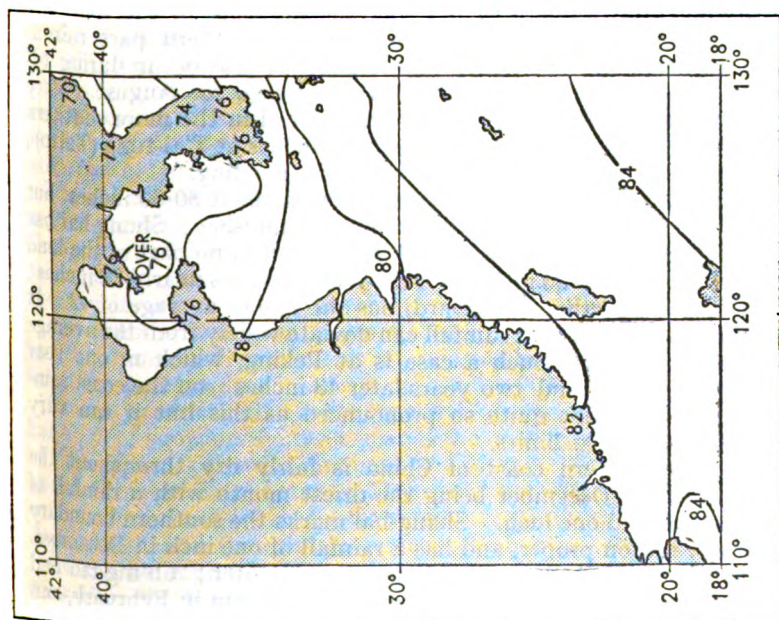


Fig. 16.
Mean sea temperature—August.

of China as far northward as Tung-hai has an average of from 75 to 80 per cent., being slightly higher in the south. There is a decrease in humidity between here and Ch'ing-tao, and between Ch'ing-tao and Taku the relative humidity falls from 70 per cent. to 55 per cent.

5 Humidity varies between 60 per cent. at Ying-k'ou and 70 per cent. at An-tung. Mokp'o, in the southern part of Korea, has an average humidity of 70 per cent. Diurnal variation is about 25 per cent. in the extreme north, and between 15-20 per cent. for the rest of the region.

10 In summer, humidities generally are greater throughout the region. The northern coast of Formosa is an exception, however, its average being under 80 per cent. in July and August; the average on the southern coast is 85 per cent. The entire south-eastern and eastern coasts of China have a humidity greater than 80 per cent. On the 15 southern shore of Po hai, and the land eastward, the average is from 75 to 80 per cent. The north is now slightly lower in relative humidity, averaging 75 per cent. in August. Mokp'o has an average of 85 per cent.

Rainfall.—Formosa has a very heavy annual rainfall; this island 20 generally has an average of about 80 inches. The central part of the eastern coast averages rather less than this amount, and the northern and southern extremities considerably more. Chi-lung, in the northern part, which is exceptionally wet, averages about 115 inches a year. Except in the northern part, the rainfall is seasonal in character. 25 In winter, rainfall is not heavy, and at Heng-ch'un the December average is only one inch, whilst further north generally, the rainfall rarely exceeds 3 or 4 inches during any winter month. Chi-lung, being exposed to the monsoon which blows direct from the ocean, receives 11 to 12 inches during each month from December to March. 30 In summer, the whole area is under the influence of the southerly monsoon and receives heavy rain. In the southern part rain is liable to occur in very heavy showers which also occur during typhoon disturbances; 20 inches is the average for August. Very heavy falls in 24 hours have been experienced in the more southern 35 parts, the heaviest yet recorded being 16 inches at T'ai-tung (Taito); such heavy falls often give rise to serious flooding.

The south-eastern coast of China averages about 50-60 inches, but further northward the amount of rainfall diminishes; Shang-hai has the yearly average of 40 inches, whilst rainfall in no part of the land 40 near Po hai exceeds 30 inches. Ying-k'ou averages nearly 26 inches; Mokp'o, being further southward, has the higher average of 42. It must be emphasised that rainfall can deviate widely from the average from year to year. Such a case is at Peking, which in one year received 6 inches, and two years later 43 inches; on the coast rain- 45 fall variation is not quite so pronounced as this but it can vary between very wide limits.

The south-eastern coast of China is fairly dry throughout the winter months, December being the driest month with a rainfall of between 0.5 and one inch. Shang-hai marks the southern boundary 50 of the dry season proper, and has a rainfall of one inch in December. Further northward winter rains are much lighter; Ch'ing-tao and Wei-hai-wei both have only about 0.5 inch of rain in February, and land bordering Po hai receives at most 0.2 inch as an average in February. The southern part of Korea is more rainy with every 55 month, receiving at least an inch of rain on an average.

Summer is the wet season over the whole region although the

average amount of rain differs considerably in different parts. Rain-fall on the south-eastern coast of China is much less than in Formosa. The wettest month near Lien-hua-feng chiao is June, with 12 inches. Although rainfall falls off a little northwards, Yung-chia-cheng shows a higher figure than the coast immediately southward, namely 10 inches in June. Shang-hai is rather less wet, and August is the wettest month there with 6 inches ; Ch'ing-tao is a little more exposed, and gets 6 inches in July ; Wei-hai-wei has an average fall of 7 inches during July. Along the shores of Po hai the monthly average in summer does not exceed 6 inches. In Korea, at Inch'ön, the average total for July and August combined is 20 inches, and at Mokp'o, further southward, 15 inches.

There have been some heavy falls of rain in 24 hours in addition to the very exceptional fall of 16 inches at T'ai-tung (eastern Formosa) to which reference has already been made. Yen-t'ai has had 10 inches on one June day ; Hsia-men 9 inches on one April day, Mokp'o 8 inches and Shang-hai 6 inches, (*see* also Climatic Tables pages 64 to 79.)

Days with appreciable rainfall (0.04 inches or more) are more frequent in the south than in the north. Formosa, particularly in its northern part, has a great many such days ; Tai-pei has about 170, evenly distributed over the year, and Chi-lung some 200, with about 20 per month in winter and 8 or 9 per month in summer. On the mainland, days of appreciable rain are far less frequent : about 50 at Lien-hua-feng chiao in an average year, with a June maximum. Yung-chia-cheng has about 120, with a maximum in late spring, and Shang-hai about 100, fairly evenly distributed through the year ; there are, however, slightly more days of appreciable rain in spring than at any other time. Further northward, days with rain are considerably fewer. Ch'ing-tao has an average of about 65 ; these are chiefly in summer. The shores of Po hai have even fewer, whilst Hou-chi tao (Howki), with less than 30, is outstanding ; here there is only occasionally a day with appreciable rain in winter. The western coast of Korea has about 80 in the northern and central parts and these are principally in summer ; Mokp'o, in the southern part, has a fairly evenly distributed yearly average of about 100.

Days of considerable rain (0.40 inches or more) per month in the wettest months average fully 10 in Formosa and 6 to 8 at Hsia-men, Shang-hai, and Mokp'o. At T'ien-ching there are 5 or 6 such days per month in July and August. In the north a fall of 0.40 inches in one day in winter is very unusual.

The climatic tables on pages 64 to 79 contain rainfall statistics for 16 stations, and some of this information has not been given in the foregoing paragraphs.

Snow is experienced in latitudes north of about 28° N. At Shang-hai a fall of snow on 6 days a year is the average ; the normal limit of these snows is between January and March. Ch'ing-tao averages about 15 snow days between December and March. Wei-hai-wei suffers from occasional snow storms (e.g. during extra-tropical depressions), and there is an average of about 30 days with snow. Snow can be expected now and again from November to March at Ying-k'ou, the longest normal period in the area, but only falls on about 20 days. The range of possible snowfall decreases only slightly on the shores of the approaches of Yalu chiang, so that Mokp'o, in the extreme south-west of Korea, has 30 snow days a year which occur between the middle of November and the middle of March.

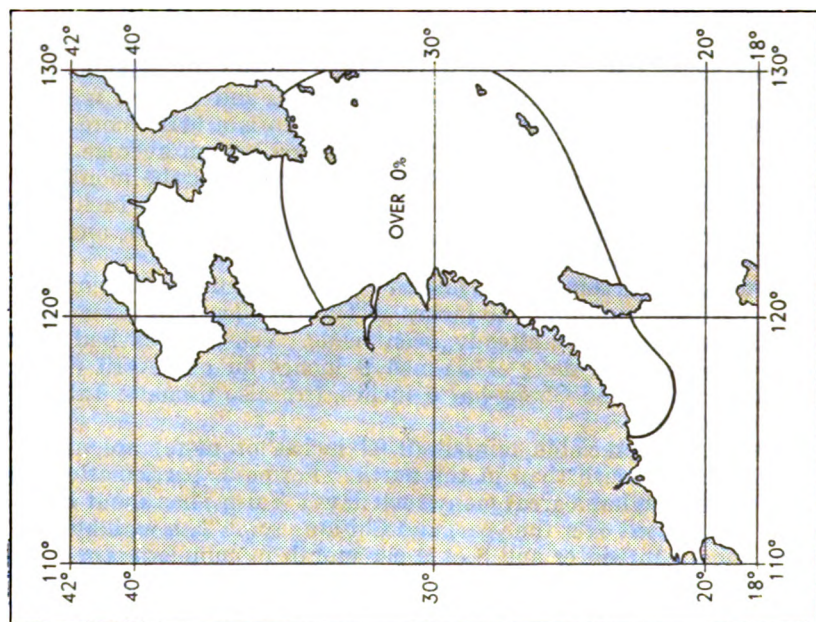


Fig. 19.
Percentage frequency of fog—November.

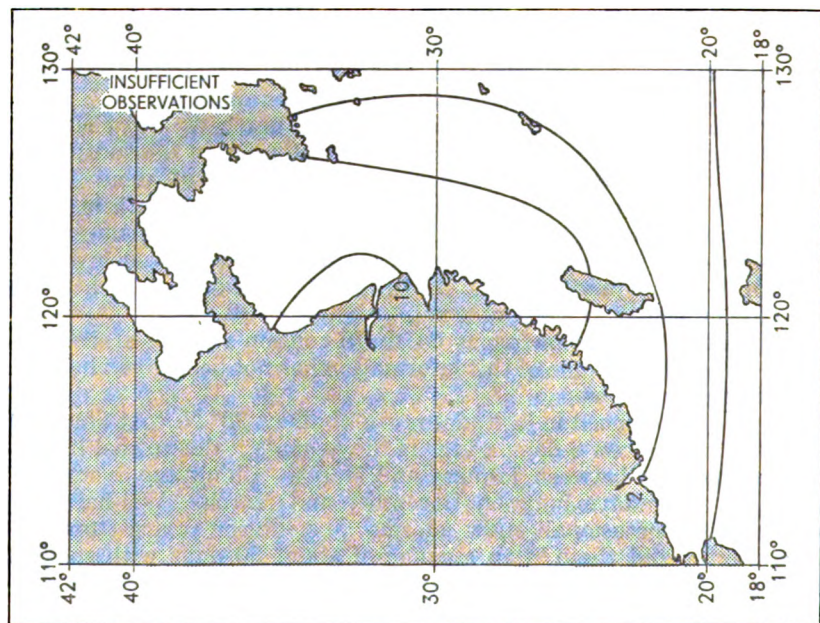


Fig. 18.
Percentage frequency of fog—May.

Thunderstorms.—These are experienced to the extent of between 10 and 20 annually throughout the coasts of China and Korea; they are slightly more common in the south than in the north, and in all cases occur almost entirely during the summer months. There are more thunderstorms in Formosa than on the mainland, the north-western coast being particularly affected. At Tai-pei, in fact, there are as many as 40 a year and about 15 of these come in August. Storms on the mainland vary from about 15 at Shang-hai and 20 at Ch'ing-tao and Shan-tung kao-chiao to 10 on the northern shore of Yellow sea and on the coast of Korea. Near Yung-chia-cheng thunderstorms are frequent during the summer months especially between 0600 and 2000. Except near Shan-tung kao-chiao, where the storm season lasts from May to August, the bulk of the thunderstorms occur in July and August in all parts.

Visibility and Fog.—(See figures 18 and 19). For the most part, fog is most common in spring and early summer. Formosa is almost free, 9 being the average annual number of days with fog at Chi-lung (mainly in spring); at Heng-ch'un fogs are very rare. On the south-eastern coast of China, fog days average about 20 per year. At Hsia-men these occur mainly in the spring and at Fu-chou in the winter; at both places, summer is almost free from fog. On the mainland further northward fogs are less frequent, but at Ta-ch'i shan 69 is the mean number, May and June being the foggiest periods. Fogs are common at the mouth of Huang-p'u chiang from November to June; these often clear away by about midday. At Ch'ing-tao fog is frequent in June and July, and at Shan-tung kao-chiao about 25 days with fog are experienced annually. Wei-hai-wei has some 20 a year, mainly in July, and they are very uncertain in character; a fog will lift and disperse then settle down again with practically no warning. The coast westward of Wei-hai-wei is comparatively free; Ying-k'ou experiences only 4 fogs a year, and these occur principally in winter. The northern shore of Yellow sea is decidedly more foggy, some 20 being the annual mean; at Ta-lien there is a maximum in July of about 6 or 7, but at An-tung fogs can be expected at any time of the year. Fogs are slightly more common on the western coast of Korea—there is an annual average of 41 at Inch'ön and 24 of these come between May and July. Mokp'o, in the southern part, has 21, of which 14 come between April and July.

Visibility in the south is often affected by dust haze in winter. Dust-storms, composed of fine sand, are a cause of impaired visibility on the central part of the Chinese coast. These dust-storms are brought by north-westerly winds in November, December and January. The sand is probably raised from the Ordos desert of Inner Mongolia, and the wind is usually of the cold front or line-squall type (see standard article on Lows, page xxxviii) and normally blows with gale force at sea and southward of Shan-tung kao-chiao. After the wind has subsided the fine sand falls so as to form a thick and very persistent layer on shore and on the decks of ships.

Cloudiness.—Cloud amount decreases northward: Tai-pei, with 7 tenths, has the greatest cloud amount in the Formosa area; the southern parts of Formosa have the mean annual amount of 6. Tai-pei has the greatest average amount in winter, whilst Heng-ch'un experiences its greatest cloud amount in early summer, with winter as the clearest period. On the south-eastern coast of China generally the cloud amount is rather less than over Formosa and there is, as at

Heng-ch'un, a summer maximum and a late autumn minimum. In the north, cloud amount differs more strongly in different seasons. At Ying-k'ou, for instance, the yearly mean cloud amount is 4; the amount is 6 in summer but frequently averages about 2 in December.

Cloud amount is rather greater on the coast of Korea, and the average at Mokp'o is over 6, being nearly 8 in July and 5 in October.

Overcast days are much more common in the south than in the north, Formosa as a whole has about 100 such days a year, there being more during summer than any other part of the year; Tai-pei is particularly cloudy, and, due mainly to overcast skies in winter, has the annual average of nearly 200 days. The mainland has well over 100 days of cloud in the south-east. Shang-hai is one of the cloudiest places on this coast; here there is an average of about 170 a year, with the slight spring maximum of 17 days a month. Shan-tung kao-chiao is freer from cloudy days, 100 being the annual mean, whilst the northern shore of Yellow sea has only some 60 such days a year; July with 9 days is the cloudiest month. Korea has as many cloudy days as the more southern parts of China; as many as 20 days of cloud are experienced at Mokp'o during a typical July.

The number of clear or bright days increases northward along the coast, as is to be expected; 30 is the average annual figure at Tai-pei and 150 at Taku; at the latter place there are 15 clear days during each winter month but few during the summer. Korea is less bright than the northern shore of Yellow sea; 50 is the annual number of clear days at Mokp'o.

Throughout the year there is an appreciable difference between the cloud amount over land and sea areas: during the winter monsoon season, though skies above sea areas are cloudy, those over most land areas are relatively free. During the summer monsoon season, cloud amount is high on the land areas, but relatively low over the sea except in June.

Climatic tables.—The tables that follow give statistics for several land stations at which there is a regularly reporting weather station. The figures given are averages, percentage frequencies, or extremes, as stated; it must be realised that these values refer to the actual positions in which the weather has been observed and not necessarily to the open sea or to the approaches to ports in the vicinity. The tables for land stations should therefore be consulted with discretion, since most meteorological elements are affected, sometimes a great deal, by local conditions. The following notes indicate ways in which conditions in the open sea may be different from those at the nearest reporting station for which a table is published:—

- (1) Temperatures over the sea are less extreme, or show smaller departures from the mean, than those over the land. In winter the air temperature over the sea is usually higher than that at a land station, especially during the night and early part of the day. In summer the air temperature over the sea is usually lower than that at a land station, especially during the afternoon.
- (2) Rainfall is generally only roughly representative of conditions at sea within, say, 100 miles.
- (3) Cloud amount, which in this region is very variable, is only broadly representative of the state of the sky at sea. There is a tendency for the amount to be less at sea than on the coast during the day, but to be slightly greater at night.

- (4) Wind speed is nearly always greater over the sea than over the land, and there may be twice the number of gales at sea than are experienced at a shore station unless it is exceptionally well-exposed on, for example, a headland or small low-lying island. Wind direction is affected as explained on page li. 5
- (5) The figures for fog or poor visibility at inland stations or sheltered harbours are no guide to conditions at sea and in the approaches to ports (*see* page liii). When there is fog on the coast in winter, better visibility will generally be found at sea. 10

PLACE—SHAN-T'OU. LAT. 23° 21' N., LONG. 116° 40' E. Height above Mean Sea Level, 10 feet.

CLIMATIC TABLE COMPILED FROM 1 TO 53 YEARS' OBSERVATIONS, 1880 TO 1941.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE				Relative humidity	Sky No. of days	Rain	WIND DIRECTION												Mean wind force	No. of days with wind Force 8 or more	No. of days with visibility less than ½ mile				
		Mean of		Highest in each month	Lowest in each month																						
		Daily max.	Daily min.																								
		Percentage of observations from												Percentage of observations from													
		N.	NE.			E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm						
		Mean of day	p.m.																								
January	1022	62	51	72	41	82	73	3	11	1.4	4	22	39	27	7	0	0	0	2.0	0.8	2						
February	1020	62	52	75	44	84	77	3	7	2.3	6	11	42	31	7	2	2	0	2.2	0.7	3						
March	1018	67	56	80	47	87	79	6	13	3.3	8	5	38	29	10	5	4	0	1.9	0.3	5						
April	1015	75	63	86	54	89	82	1	14	5.7	9	5	31	30	12	9	9	1	1.9	0.3	3						
May	1010	82	72	90	66	85	78	5	7	8.5	9	2	22	33	14	11	13	1	1.9	0.1	0.4						
June	1006	86	77	92	71	90	82	7	9	10.1	12	2	15	17	10	15	36	2	1.9	0.1	0.4						
July	1006	88	79	95	76	89	81	3	9	8.1	13	1	9	21	15	17	26	7	1.9	0.6	0.3						
August	1005	89	79	97	74	89	78	3	10	8.4	10	2	9	18	16	13	29	8	1.8	0.8	0.3						
September	1010	87	76	94	70	85	73	8	7	5.2	8	6	30	30	11	4	8	5	2.0	0.5	0						
October	1016	81	68	87	61	83	73	11	4	2.4	1	13	45	32	5	1	1	1	2.0	0.7	0						
November	1019	74	62	83	55	82	72	5	11	1.7	3	19	44	25	7	1	0	0	1.9	0.1	0						
December	1021	68	56	76	43	85	72	3	5	1.5	4	17	42	26	7	1	1	5	1.9	0	0.4						
Means	1014	77	66	98* 40**	86	77		—	—	—	—	9	30	26	10	7	11	3	1.9	—	—						
Totals	—	—	—	991.36†	—	—	—	87	107	58.6	87	—	—	—	—	—	—	—	—	—	6	15					
Extreme values	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—					
No. of years' observations	14	7																			5	8.9	8.9				

*Mean of highest each year. **Mean of lowest each year. Standard of time : 120° E. meridian. †Highest recorded temperature. ‡Lowest recorded temperature.

Authorities:—Nanking, Annual Meteorological Report.
Nanking, Monthly Meteorological Bulletin.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—HSIA-MEN. LAT 24° 26' N., LONG. 118° 04' E. Height above Mean Sea Level 16 feet.
CLIMATIC TABLE COMPILED FROM 2 TO 45 YEARS' OBSERVATIONS, 1880 TO 1934.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE Mean of			Relative humidity	Sky No. of days	Rain	WIND DIRECTION																Mean wind speed	No. of days with gale	No. of days with fog								
		Daily max.	Daily min.	Highest in each month				Lowest in each month	Mean of day	Clear less than 2/10	Cloudy more than 8/10	Average fall	0.04 in. or more	Percentage of observations from								Percentage of observations from												
					0600									1400								Mean of day												
					Percentage of observations from									Percentage of observations from								Mean of day												
					N.	NE.	E.							SE.	S.	SW.	W.	NW.	Caln	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Caln	N.	NE.	E.	SE.	S.	SW.
January	mb.	° F.	° F.	° F.	%	in.	11	67	6	5	1	2	3	5	0	6	47	20	12	5	3	2	5	0	0	0.3	0.9							
February	1021	62	52	72	43	77	7	63	11	11	3	0	1	2	7	3	37	20	24	5	4	4	5	0	0	0.5	3							
March	1018	61	52	72	47	80	6	54	8	22	4	2	5	1	2	2	43	15	18	8	2	4	6	0	0	0.4	4							
April	1017	72	63	82	53	81	4	57	13	22	4	2	6	4	0	4	29	9	37	12	3	3	2	0	0	0	3							
May	1009	79	71	87	63	81	1	51	18	13	3	1	6	3	0	3	27	11	41	10	3	0	3	2	1	0	1							
June	1006	85	77	91	68	82	4	42	13	33	6	3	1	4	0	2	16	6	35	23	9	1	2	1	0	0	0.2							
July	1005	89	80	95	75	79	8	21	6	29	12	15	3	0	0	1	5	13	43	23	8	6	1	0	0	0.5	0.1							
August	0410	89	80	94	76	79	8	22	18	22	12	10	3	0	0	2	20	6	40	25	5	2	0	0	0	0.2	0							
September	1009	87	78	93	72	74	9	17	3	26	13	15	3	0	3	7	28	7	23	12	9	5	1	0	0	0.1	0.1							
October	1014	82	71	89	63	70	10	6	4	3	1	3	3	0	0	11	46	16	13	8	2	1	1	0	0	0.7	0.1							
November	1018	74	64	82	55	72	11	50	2	9	1	3	3	6	0	11	53	8	13	4	1	3	3	0	0	0	0.1							
December	1020	68	57	76	47	75	16	56	6	5	1	6	7	3	0	6	47	16	13	5	4	6	3	0	0	0.4	0.5							
Means	1013	76	67	95° 42**	77	—	—	—	—	—	—	—	—	—	—	9	49	6	11	9	6	7	3	0	1	4.3	—							
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	13						
Extreme values	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	13					
No. of years' observations	15	12-13	18-19	16	5-8	45	6-8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	—						

Standard of time : 120° E. meridian.
*Mean of highest each year. †Highest recorded temperature.
**Mean of lowest each year. ††Lowest recorded temperature.

Authorities:—M.S. data at M.O.

Hsi-chia-hui (Zikawei) Revue Mensuel, 1923-34.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—FU-CHOU (MA-WEI ANCHORAGE, MIN CHIANG). LAT. 25° 59' N., LONG. 119° 27' E. Height above Mean Sea Level, 65 feet.

CLIMATIC TABLE COMPILED FROM 4 TO 39 YEARS' OBSERVATIONS, 1894 TO 1937.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE			Relative humidity	Sky No. of days	Rain	WIND DIRECTION										Mean wind force	No. of days with Force 8 or more	No. of days with fog																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
		Daily max.	Daily min.	Mean of				Percentage of observations from																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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January	1023	56	47	72	37	80	—	in.	20	43	5	1	1	2	22	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

*Mean of highest each year.

**Mean of lowest each year.

†Highest recorded temperature.

††Lowest recorded temperature.

Authorities:—Nanking, Annual Meteorological Report.

METEOROLOGICAL OFFICE,

AIR MINISTRY.

PLACE—APARRI. LAT. 18° 22' N., LONG. 121° 38' E. Height above Mean Sea Level, 17 feet.
CLIMATIC TABLE COMPILED FROM 10 TO 36 YEARS' OBSERVATIONS.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE		Sky No. of days	Rain No. of days with 0.04 in. or more	WIND DIRECTION												Mean wind speed	No. of days with Force 8 or more	No. of days with fog or mist																	
		Daily max.	Daily min.			Relative humidity		Percentage of observation from						Percentage of observations from																							
						Highest in each month	Lowest in each month	1400		0800						1400																					
								Clear less than 2/10	Cloudy more than 8/10	Average fall		Percentage of observation from									Percentage of observations from																
										No. of days with 0.04 in. or more	Average fall	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm								
January	mb.	81	68	88	64	89	70	74	4	16	5	14	2	32	6	56	26	3	5	4	2	1	40	13	66	16	3	4	2	1	1	0	0	0	2	7.4	0.3
February		86	73	92	69	90	72	78	7	12	3	6	2	36	9	55	24	2	4	0	0	1	40	15	58	17	3	4	2	1	1	0	0	0	1	7.6	—
March		89	75	94	70	90	69	80	12	8	2	3	1	38	9	57	23	2	0	0	0	1	41	16	60	16	3	4	2	1	1	0	0	0	1	7.5	—
April		90	76	95	71	91	69	81	11	5	2	3	1	40	10	58	23	2	0	0	0	1	42	16	61	16	3	4	2	1	1	0	0	0	1	6.7	—
May		93	78	97	72	92	70	83	8	5	4	3	1	27	10	60	21	3	0	0	0	1	44	18	63	17	3	4	2	1	1	0	0	0	1	6.4	—
June		95	80	98	73	93	71	85	5	4	4	3	1	24	10	62	22	4	0	0	0	1	45	19	65	18	3	4	2	1	1	0	0	0	1	6.5	—
July		96	81	99	74	94	72	86	3	10	5	3	1	21	9	63	23	5	6	1	1	2	46	20	66	19	3	4	2	1	1	0	0	0	1	6.6	—
August		97	82	100	75	95	73	91	3	15	6	2	1	18	8	64	24	6	2	2	2	3	47	21	67	20	3	4	2	1	1	0	0	0	1	6.7	—
September		98	83	101	76	96	74	92	3	14	11	3	1	16	7	65	25	3	3	3	3	4	48	22	68	21	3	4	2	1	1	0	0	0	1	6.8	—
October		100	84	102	77	97	75	93	4	17	14	3	1	13	6	66	26	4	4	4	4	5	49	23	69	22	3	4	2	1	1	0	0	0	1	6.9	—
November		101	85	103	78	98	76	94	3	16	12	3	1	11	5	67	27	5	5	5	5	6	50	24	70	23	3	4	2	1	1	0	0	0	1	7.0	—
December		102	86	104	79	99	77	95	3	19	13	3	1	10	4	68	28	6	6	6	6	7	51	25	71	24	3	4	2	1	1	0	0	0	1	7.1	—
		103	87	105	80	100	78	96	3	18	14	3	1	9	3	69	29	7	7	7	7	8	52	26	72	25	3	4	2	1	1	0	0	0	1	7.2	—
		104	88	106	81	101	79	97	3	17	15	3	1	8	2	70	30	8	8	8	8	9	53	27	73	26	3	4	2	1	1	0	0	0	1	7.3	—
Means		1010	87	73	99*	63**	91	71	—	—	—	—	—	—	2	11	7	4	24	13	3	2	34	15	51	16	3	5	3	1	4	2	6.9	—	—		
Totals		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of observations		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

*Mean of highest each year. **Mean of lowest each year. Standard of time : 120° E. meridian.
†Highest recorded temperature. ‡Lowest recorded temperature.

Authorities:—M.S. data supplied by Weather Bureau, Manila.
Annual report of the Weather Bureau, Manila.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—TAI-PEI. LAT. 25° 02' N., LONG. 121° 31' E. Height above Mean Sea Level, 30 feet.

CLIMATIC TABLE COMPILED FROM 10 TO 37 YEARS' OBSERVATIONS, 1897 TO 1935.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE		Relative humidity	Sky No. of days	Rain	WIND DIRECTION										No. of days with gale	No. of days with fog													
		Daily max.	Daily min.				0600					1400							Mean wind speed												
							Percentage of observations from													Mean of day											
							Percentage of observations from																								
							N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.					NE.	E.	SE.	S.	SW.	W.	NW.	Calm			
January	mb.	66	54	80	44	91	71	%	in.	9	7	43	10	2	2	3	5	30	16	53	5	1	0	3	7	11	6	6	2		
February	1020	65	53	80	44	92	75	%	in.	13	12	45	5	4	4	3	6	28	13	50	4	1	1	1	2	15	7	21	3	1	
March	1018	70	57	85	48	90	69	%	in.	12	13	40	8	3	4	4	4	31	14	41	4	1	1	1	1	18	7	20	5	1	
April	1014	77	63	90	53	92	71	%	in.	14	14	30	8	3	3	3	4	45	9	33	4	1	1	1	1	25	7	25	5	1	
May	1010	83	69	92	61	92	68	%	in.	13	13	30	6	6	2	3	3	49	7	23	4	1	1	1	1	20	7	20	5	1	
June	1007	89	73	95	67	93	68	%	in.	10	10	30	8	3	3	3	3	60	7	19	3	1	1	1	1	18	7	21	3	1	
July	1006	92	76	96	72	91	62	%	in.	12	12	14	12	8	3	2	2	58	11	22	8	0	3	3	3	20	7	20	5	1	
August	1005	91	75	96	71	91	64	%	in.	10	10	10	10	9	4	2	1	54	9	10	0	0	2	2	2	17	7	27	3	1	
September	1009	88	73	94	66	92	64	%	in.	12	12	10	10	5	2	2	2	44	8	18	4	0	2	1	1	23	7	27	3	1	
October	1015	81	67	91	59	90	65	%	in.	9	9	8	10	5	2	0	0	27	3	24	8	1	1	1	1	18	7	27	3	1	
November	1019	75	62	87	50	90	65	%	in.	8	8	5	9	3	2	1	1	27	4	20	5	1	1	1	1	6	7	27	3	1	
December	1021	69	57	82	46	90	69	%	in.	8	8	4	6	2	3	2	2	31	5	15	6	0	2	2	2	10	3	27	3	1	
Means	1014	79	65	97	41	91	68	%	in.	8	8	5	8	5	3	3	3	40	7	15	4	1	2	2	2	10	3	27	3	1	
Totals	—	—	—	—	—	—	—	%	in.	83	83	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	—	—	—	—	%	in.	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	—	37	37	37	10	37	10	10	10	37	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

*Mean of highest each year. **Mean of lowest each year. Standard of time : 120° E. meridian.

†Highest recorded temperature.

‡Lowest recorded temperature.

Authorities:—M.S. data supplied by Meteorological Observatory, Tai-pei.

Jinsen (Inch'on), Meteorological Observatory, Climatic tables for Korea, and some other stations in the World.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—CHI-LUNG. LAT. 25° 09' N., LONG. 121° 45' E. Height above Mean Sea Level, 105 feet.
CLIMATIC TABLE COMPILED FROM 14 TO 34 YEARS' OBSERVATIONS, 1900 TO 1933.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE				Relative humidity	Sky No. of days	Rain	WIND DIRECTION												Mean wind force or speed	No. of days with gale	No. of days with visibility less than 1 mile			
		Mean of							Mean of day	Clear less than 2/10	Cloudy more than 8/10	Average fall	No. of days with trace or more	Mean of day						p.m.						
		Daily max.	Daily min.	Highest in each month	Lowest in each month	Percentage of observations from								Percentage of observations from												
		N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm							
January	mb.	65	56	77	47	85	22	11-7	22	28	30	13	4	7	8	2	6	1	—	—	—	—	—	—	—	—
February	1021	64	55	78	47	86	21	11-3	21	28	28	12	5	7	9	3	8	2	—	—	—	—	—	—	—	—
March	1018	67	57	80	49	86	21	12-0	21	25	25	13	5	8	9	3	10	2	—	—	—	—	—	—	—	—
April	1014	74	63	86	55	85	18	8-4	18	22	22	14	6	10	11	4	7	4	—	—	—	—	—	—	—	—
May	1011	80	69	90	62	85	15	10-8	15	14	21	18	8	13	13	3	5	5	—	—	—	—	—	—	—	—
June	1007	86	74	94	67	83	10	9-2	10	10	21	14	7	18	24	6	4	4	—	—	—	—	—	—	—	—
July	1006	90	76	95	73	80	9	8-4	9	9	19	14	12	19	22	6	5	4	—	—	—	—	—	—	—	—
August	1005	89	76	95	73	80	15	8-9	15	9	10	17	12	18	20	5	5	4	—	—	—	—	—	—	—	—
September	1009	86	74	93	69	81	5	9-5	12	16	22	21	10	11	9	2	5	4	—	—	—	—	—	—	—	—
October	1015	79	69	88	63	81	2	9-5	18	10	37	20	7	6	4	1	3	3	—	—	—	—	—	—	—	—
November	1019	73	64	84	56	81	1	11-0	20	22	37	20	6	5	4	1	3	3	—	—	—	—	—	—	—	—
December	1021	68	59	77	50	83	24	11-0	22	24	33	17	6	6	6	1	5	2	—	—	—	—	—	—	—	—
Means	1014	77	66	85° 45'	—	83	27	11-8	213	19	24	16	7	11	12	3	6	3	—	—	—	—	—	—	—	—
Totals	—	—	—	1001° 37'	—	—	27	211	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	—	34	34	34	14	34	21	34	34	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21

*Mean of highest each year. **Mean of lowest each year. †Highest recorded temperature. ††Lowest recorded temperature.

Authorities:—MS. data supplied by Meteorological Observatory, Tai-pei.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—SHANG-HAI (HSÜ-CHIA-HUI). LAT. 31° 12' N., LONG. 121° 26' E. Height above Mean Sea Level, 23 feet.
CLIMATIC TABLE COMPILED FROM 9 TO 62 YEARS' OBSERVATIONS, 1873 TO 1935.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE		Relative humidity	Sky No. of days	Rain	WIND DIRECTION												Mean wind speed	No. of days with mean wind speed less than 4 mile													
		Mean of					0630						1330																				
		Daily max.	Daily min.				Percentage of observations from						Percentage of observations from																				
							N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.			SE.	S.	SW.	W.	NW.	Calm							
January	1027	46	33	62	19	58	23	13	8	6	3	2	11	30	4	22	11	10	7	5	4	13	27	1	8	0	11	1	0	3	2		
February	1025	47	34	63	23	89	21	18	15	8	4	2	6	21	5	23	16	11	9	5	5	3	9	22	2	7	4	10	7	0	2	4	
March	1021	55	40	75	28	89	18	14	15	17	8	5	7	13	3	19	12	14	15	10	6	10	14	0	8	2	11	8	0	3	4	4	
April	1016	66	50	84	37	91	10	11	19	23	12	4	4	11	6	13	10	17	21	14	5	8	11	7	1	7	4	11	3	0	3	3	
May	1011	77	59	89	47	92	5	8	21	33	12	3	4	7	7	8	8	23	29	13	3	3	7	2	2	7	2	11	1	0	5	5	
June	1006	82	67	95	58	94	66	4	5	23	31	15	4	4	4	4	12	20	25	13	9	6	6	1	2	7	0	11	3	0	3	1	
July	1005	90	74	98	67	93	66	4	8	18	38	28	4	2	3	4	13	6	11	22	16	10	7	5	1	6	8	10	7	0	6	3	
August	1006	90	74	97	67	94	65	4	20	24	26	13	4	4	4	13	6	11	22	16	10	7	5	1	6	8	10	7	0	6	3	2	
September	1012	82	66	92	56	94	64	3	10	5	1	11	23	7	19	23	19	13	6	2	5	13	0	6	2	9	8	0	1	3	3	3	
October	1019	74	57	84	42	92	53	7	9	2	8	4	8	18	6	22	17	18	10	5	3	6	18	1	6	2	9	7	0	1	5	5	
November	1024	63	45	75	30	90	55	9	6	2	0	6	11	21	6	18	11	12	10	7	5	13	21	3	6	6	9	4	0	4	5	5	
December	1026	53	36	66	22	89	62	10	10	1	4	6	2	12	31	4	19	14	9	10	6	2	11	29	0	8	2	10	9	0	4	4	
Means	1017	69	53	—	—	—	14	13	16	18	9	3	6	15	6	15	12	16	17	11	5	8	15	1	7	3	10	7	—	3	41	—	
Totals	—	—	—	—	64	135	44	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Extreme values	—	—	—	—	27	62	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	62	38	62	104†	10	62	9	—	—	—	—	—	—	—	—	—	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18

Standard of time : 120° E. meridian.
† Highest recorded temperature
‡ Lowest recorded temperature.

Authorities:—MS. Data supplied by Hsü-chia-hui Observatory,

Hsü-chia-hui Observatory, Bulletin.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—WEI-HAI-WEI. LAT. 37° 30' N., LONG. 122° 06' E. Height above Mean Sea Level, 38 feet.
CLIMATIC TABLE COMPILED FROM 3 TO 24 YEARS' OBSERVATIONS, 1899 TO 1935.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE				Relative humidity	Sky No. of days	Rain	WIND DIRECTION												Mean wind force	No. of days with Force 8 or more	No. of days with fog																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
		Daily max.	Mean of						0600/1400	Clear less than 2/10	Cloudy more than 8/10	Average fall	No. of days with 0.04 in. or more	Percentage of observations from																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
			Daily min.	Highest in each month	Lowest in each month									Percentage of observations from																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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														N.	NE.	E.	SE.	S.	SW.	W.				NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Mean of day																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
January	mb.	° F.	° F.	° F.	%	8	8	0.6	0.3	25	7	2	2	6	13	14	26	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

°Mean of highest each year. Standard of time: 120° E. meridian. ††Lowest recorded temperature.

Authorities:—Hsü-chia-hui, Observatoire, Bulletin des Observations.

M.S. data in M.O.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—YEN-T'AI. LAT. 37° 34' N., LONG. 121° 30' E. Height above Mean Sea Level, 76 feet.
CLIMATIC TABLE COMPILED FROM 5 TO 25 YEARS' OBSERVATIONS, 1905 TO 1932.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE			Relative humidity	Sky No. of days	Rain	WIND DIRECTION												Mean wind speed	No. of days with Force 8 or more	No. of days with fog										
		Daily max.	Daily min.	Mean of				Percentage of observations from						Percentage of observations from									Mean of day									
								Highest in each month	Lowest in each month	0600						1400																
										N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.					NE.	E.	SE.	S.	SW.	W.	NW.	Calm	
January	1027	mb.	34	24	47	14	16	23	8	3	3	4	12	14	19	16	1	27	8	6	2	9	17	22	0	16.1	3	0.8				
February	1026	37	25	53	68	23	33	15	4	2	2	7	17	22	16	9	0	3	27	14	4	1	7	9	13	25	0	15.0	2	0.7		
March	1022	47	33	68	82	33	46	7	6	4	4	10	19	22	18	9	1	0	15	17	16	5	9	6	16	0	14.8	2	0.7			
April	1016	61	45	82	90	46	71	4	8	4	4	8	26	23	14	6	1	1	15	17	13	8	14	9	6	17	0	12.4	2	0.7		
May	1011	72	55	90	94	56	76	4	8	4	4	10	27	23	12	3	3	13	17	11	13	8	7	16	11	0	12.2	0.6	0.7			
June	1006	80	64	94	96	64	87	5	7	3	6	11	29	14	12	4	2	9	24	20	16	18	7	2	4	0	8.2	0.2	0.5			
July	1005	84	71	95	96	64	87	7	7	4	4	13	29	14	12	6	3	19	29	16	10	10	6	2	8	0	8.9	0.6	0.5			
August	1007	84	72	93	96	66	88	6	9	4	4	15	27	14	12	6	1	25	28	10	4	9	7	5	12	0	12.2	2	0.1			
September	1014	76	65	87	93	70	86	6	11	4	8	18	21	12	7	1	2	25	18	9	3	11	9	8	17	0	13.0	3	0.5			
October	1020	67	54	79	87	43	70	4	10	3	4	25	22	12	7	1	2	23	10	4	3	10	14	17	19	0	16.7	4	0.1			
November	1024	53	40	68	28	69	57	18	6	3	3	4	22	23	15	11	2	24	6	5	2	6	14	23	20	0	16.5	3	0.1			
December	1027	40	29	53	19	70	64	17	3	1	3	16	29	18	11	2	2	24	6	5	2	6	14	23	20	0	16.5	4	0.1			
Means	1017	61	48	97*	13**	74	62	13	6	6	8	21	21	15	8	2	21	18	11	6	10	9	10	15	0	13.0	—	—	23	12		
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	25	
Extreme values	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

*Mean of highest each year. Standard of time : 135° E. meridian.
**Mean of lowest each year. †Highest recorded temperature.
‡Lowest recorded temperature.

Authorities:—Tokyo, Climatic Atlas of Japan, 1929.
Tokyo, Central Meteorological Observatory, Monthly Report.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—TAKU. LAT. 38° 58' N., LONG. 117° 39' E. *Height above Mean Sea Level, 10 feet.*
CLIMATIC TABLE COMPILED FROM 3 TO 26 YEARS' OBSERVATIONS, 1870 TO 1938.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE			Relative humidity	Sky No. of days (Esti- mated)	Rain		WIND DIRECTION										Mean wind force or speed		No. of days with fog or mist																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		Daily max.	Daily min.	Mean of			No. of days with fall	No. of days with 0.04 in. or more	Mean of 0700, 1300 and 2100					Percentage of observations from					a.m.	p.m.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
				Highest in each month					Lowest in each month	Clear less than 2/10	Cloudy more than 8/10	Average fall	N.	N.E.	E.	S.E.	S.	S.W.			W.	N.W.	Calm																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Mean	° F.	° F.	° F.	%	19	2	in.	6	9	11	9	6	11	16	16	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

*Mean of highest each year. Standard of time : 120° E. meridian.
 **Mean of lowest each year. †Highest recorded temperature.
 ‡From observations at T'ang-ku 39° 0' N., 117° 37' E., 13 ft.

Authorities:—Braunschweig, Met. Zeitschrift, 1887, p. 324;
1895, p. 31.

Hsü-chia-hui, Observatoire, Bulletin des Observations.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—T'IENTSING. LAT., 39° 10' N., LONG. 117° 10' E. Height above Mean Sea Level, 13 feet.
CLIMATIC TABLE COMPILED FROM 10 TO 26 YEARS' OBSERVATIONS, 1905 TO 1930.

MONTH	PRES- SURE Mean at Sea Level	AIR TEMPERATURE Mean of		Relative humidity	Sky No. of days	Rain	WIND DIRECTION																		Mean wind speed	No. of days with fog	No. of days with fog								
		Daily max.	Daily min.				Percentage of observations from						Percentage of observations from						Mean of day																
							Highest in each month	Lowest in each month	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.		NE.	E.	SE.	S.	SW.				W.	NW.	Calm					
mb.	° F.	° F.	° F.	%	in.	No. of days with fall	Average than 8/10	No. of days with more than 2/10	Cloudy more than 2/10	Cloudy less than 2/10	0.04 in. or more fall	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Mean of day	No. of days with fog	No. of days with fog			
January	1029	33	16	45	5	68	47	16	4	3	0.1	0.5	1	21	13	11	5	8	10	9	15	8	21	10	13	5	7	15	14	14	1	6.4	2	1	
February	1027	39	21	53	9	67	42	15	3	0	0.1	0.5	1	17	12	10	4	13	13	8	16	7	18	7	8	8	10	15	20	14	0	6.8	0	0	
March	1022	52	31	70	20	69	34	13	5	0.4	2	2	2	17	14	12	10	16	11	6	10	4	13	7	9	12	14	18	14	13	0	8.2	0	0	
April	1015	68	45	86	32	63	39	10	5	0.5	2	4	4	14	13	10	9	14	15	10	5	10	5	13	5	6	13	10	19	18	16	0	8.7	0	0
May	1010	80	56	96	45	69	39	10	5	1.1	4	6	6	13	16	14	9	12	15	8	8	5	13	7	10	14	11	18	13	13	1	8.7	0	0	
June	1005	89	66	101	56	77	44	7	7	2.4	6	10	10	6	14	15	18	11	14	7	6	9	9	7	12	17	15	15	14	11	0	7.4	0	0	
July	1004	90	73	101	65	88	59	5	7	7	4	10	10	7	16	15	17	17	10	3	6	9	5	7	13	24	17	14	12	8	0	6.0	0	0	
August	1007	97	72	96	64	88	60	7	9	6.0	9	10	9	16	15	13	7	9	12	5	9	14	12	14	14	13	15	9	8	1	5.1	0	1		
September	1015	79	62	89	50	82	48	11	5	1.7	4	1	1	13	10	8	3	14	15	6	12	12	11	13	6	8	9	13	10	1	5.8	0	0		
October	1020	68	48	81	36	73	41	16	8	0.6	1	1	1	13	10	7	14	17	8	10	10	11	13	6	8	9	22	15	14	0	6.6	0	0		
November	1025	49	33	65	20	69	45	18	3	0.4	2	2	2	18	12	6	5	16	7	13	16	7	20	6	8	5	9	17	16	17	2	6.8	0	0	
December	1028	36	21	47	10	65	44	18	3	0.2	1	1	1	22	9	7	5	7	11	10	17	13	12	23	6	7	4	9	19	15	2	6.6	0	0	
Means	1017	64	45	103*	3**	73	45	—	—	—	—	—	—	15	13	11	8	13	13	7	11	9	14	8	10	11	12	17	14	13	1	6.9	—	—	
Totals	—	—	—	—	—	—	—	144	59	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Extreme values	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	25	24-25		109†-3††		22		10		59		25-6		10		16		17		—		—		—		—		—		—		—		—	

Standard of time: local

*Mean of highest each year

**Mean of lowest each year

†Highest recorded temperature

††Lowest recorded temperature

Authorities:—Tokyo, Central Meteorological Observatory, Monthly Report.

Nanking, National Research Institute of Meteorology,
The Chinese Rainfall, Nanking, 1936.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—YING-K'OU. LAT. 40° 40' N., LONG. 122° 14' E. Height above Mean Sea Level, 12 feet.
CLIMATIC TABLE COMPILED FROM 6 TO 29 YEARS' OBSERVATIONS, 1906 TO 1936.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE			Relative humidity	Sky No. of days	Rain	WIND DIRECTION														Mean wind speed	No. of days with fog							
		Daily max.	Daily min.	Mean of				0600							1400															
								Percentage of observations from							Percentage of observations from															
								N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.			SW.	W.	NW.	Calm			
January	mb.	24	4	39	-11	• F.	• F.	21	28	8	21	11	2	0	2	7	28	28	6	4	15	8	6	8	1	10.7	0.8			
February	1026	29	8	42	-6	• F.	• F.	20	25	11	16	13	5	1	4	9	27	28	7	3	13	12	7	5	1	10.9	0.8			
March	1022	41	23	57	7	• F.	• F.	17	19	6	14	31	8	2	6	4	29	17	2	2	20	28	10	4	0	14.0	0.4			
April	1015	58	37	72	24	• F.	• F.	10	17	3	17	31	9	1	6	8	15	6	0	4	24	34	13	4	0	13.6	0.2			
May	1010	71	51	62	36	• F.	• F.	7	10	2	17	35	7	1	6	4	21	13	0	4	24	33	18	6	0	11.3	0.2			
June	1005	80	61	69	51	• F.	• F.	7	10	5	26	39	7	0	2	9	13	6	1	5	23	33	18	6	0	9.9	0.2			
July	1005	85	69	91	62	• F.	• F.	8	13	14	20	20	3	0	1	12	10	9	3	2	15	26	10	7	1	8.2	0.2			
August	1007	94	68	81	59	• F.	• F.	6	16	8	21	22	2	3	6	8	21	11	1	4	18	26	10	7	0	9.5	0.3			
September	1014	75	55	64	42	• F.	• F.	6	18	8	24	22	4	3	7	6	24	11	1	1	20	24	9	10	0	11.3	0.7			
October	1020	62	41	51	27	• F.	• F.	14	18	8	22	19	4	3	7	2	23	24	6	4	17	13	7	6	0	12.2	0.3			
November	1024	43	24	62	8	• F.	• F.	20	25	10	15	16	3	2	7	2	23	24	3	7	17	9	8	1	0	10.9	0.3			
December	1027	29	10	44	-5	• F.	• F.	21	30	6	18	14	2	1	4	4	23	24	3	7	17	9	8	1	0	10.9	0.3			
Means	1017	57	38	93°	-13°	• F.	• F.	16	18	7	20	22	4	2	4	7	21	16	3	5	18	22	9	6	0	11.4	—			
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Extremes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
No. of years' observations	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29			

*Mean of highest each year **Mean of lowest each year Standard of time: 120° E. meridian
†Highest recorded temperature ††Lowest recorded temperature

Authorities:—Tokyo, Central Meteorological Observatory, Monthly Report.

Okada, I., the Climate of Japan, Bulletin of the Central Meteorological Observatory, Tokyo, Vol. IV, No. 2, 1931.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—MOKP'O. LAT. 34° 37' N., LONG. 126° 23' E. Height above Mean Sea Level, 107 feet.
CLIMATIC TABLE COMPILED FROM 13 TO 30 YEARS' OBSERVATIONS, 1900 TO 1930.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE			Relative humidity	Sky No. of days	Rain	WIND DIRECTION												Mean wind speed	No. of days with wind speed 29 knots or more†	No. of days with visibility less than ½ mile														
		Daily max.	Daily min.	Mean of each month				Mean of day	p.m.	Percentage of observations from						Percentage of observations from																				
					N.	NE.	E.			SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm												
																									Mean of day						Mean of day					
																									Mean of day						Mean of day					

January	1025	41	28	55	17	71	%	in.	13	52	8	6	5	6	—	—	—	—	—	—	—	—	—	—	—	10.5	0.8	
February	1023	43	29	56	19	70	—	1.5	11	53	8	4	4	5	—	—	—	—	—	—	—	—	—	—	10.7	1		
March	1020	50	35	63	26	75	—	1.5	11	43	5	4	5	10	—	—	—	—	—	—	—	—	—	—	10.9	2		
April	1016	62	45	63	36	77	—	3.7	13	31	5	4	7	18	—	—	—	—	—	—	—	—	—	—	9.1	3		
May	1012	70	53	60	46	82	—	3.6	13	22	3	4	7	23	—	—	—	—	—	—	—	—	—	—	8.0	0.3		
June	1007	77	63	63	57	82	—	5.6	16	16	4	5	8	24	—	—	—	—	—	—	—	—	—	—	8.0	0.3		
July	1007	83	71	83	62	86	—	8.7	16	9	4	5	8	24	—	—	—	—	—	—	—	—	—	—	6.8	0.5		
August	1007	83	71	81	68	82	—	17	16	5	4	5	8	24	—	—	—	—	—	—	—	—	—	—	6.8	0.5		
September	1003	87	64	88	56	77	—	11	16	4	5	8	24	—	—	—	—	—	—	—	—	—	—	—	7.0	0.9		
October	1013	70	54	79	44	73	—	4.6	12	35	12	9	7	11	—	—	—	—	—	—	—	—	—	—	7.8	0.5		
November	1022	58	42	70	31	72	—	2.0	12	43	10	7	5	9	—	—	—	—	—	—	—	—	—	—	7.4	0.2		
December	1024	46	33	60	21	71	—	1.7	13	44	9	7	6	10	—	—	—	—	—	—	—	—	—	—	9.5	0.4		
Means	1016	64	49	—	—	75	—	1.5	13	51	11	5	4	6	—	—	—	—	—	—	—	—	—	—	9.9	0.7		
Totals	—	—	—	—	—	—	—	42.4	132	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.8	12	
Extreme values	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	21	13
No. of years' observations	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

†During a period of 20 minutes before any hour of observation. ††Lowest recorded temperature.

Authorities:—MS. data supplied by Meteorological Observatory, Zinsen.

Zinsen, Results of Meteorological Observations in Työsen, Lustrums 1921-5, 1926-30.

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PLACE—INCH'ON. LAT. 37° 29' N., LONG. 126° 38' E. Height above Mean Sea Level, 231 feet.
CLIMATIC TABLE COMPILED FROM 13 TO 30 YEARS' OBSERVATIONS.

MONTH	PRES- SURE at Mean Sea Level	AIR TEMPERATURE			R. relative humidity		Sky No. of days	Rain		WIND DIRECTION														Mean wind speed	No. of days with wind speed 29 knots or more†	No. of days with visibility less than ½ mile						
		Daily max.	Daily min.	Highest in each month	Lowest in each month	Mean of day		p.m.	Clear less than 2/10	Cloudy more than 8/10	Average fall	No. of days with trace or more	Mean of day							Percentage of observations from												
													Percentage of observations from							p.m.												
													Percentage of observations from							Percentage of observations from												
													N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.				E.	SE.	S.	SW.	W.	NW.
January	mb.	33	19	46	5	67	%	%	10	6	0.8	7	27	14	9	9	7	3	6	24	1	—	—	—	—	—	—	—	8.4	0.5	2	
February	1026	36	22	50	9	65	—	—	8	6	0.7	5	22	14	6	6	11	7	9	29	0	—	—	—	—	—	—	—	8.7	0.8	1	
March	1024	45	31	60	19	65	—	—	10	6	1.2	8	18	10	6	6	15	17	14	24	1	—	—	—	—	—	—	—	9.9	1	3	
April	1016	58	42	71	33	70	—	—	8	9	2.6	8	11	9	6	8	15	17	16	17	1	—	—	—	—	—	—	—	8.5	0.5	4	
May	1012	67	52	79	45	74	—	—	5	11	3.3	9	8	7	5	8	19	23	18	11	1	—	—	—	—	—	—	—	7.8	0.4	6	
June	1007	76	61	85	54	79	—	—	3	13	3.9	9	7	7	7	8	17	25	17	10	2	—	—	—	—	—	—	—	6.6	0.2	8	
July	1007	81	69	90	62	85	—	—	2	16	10.9	15	5	8	9	10	19	26	13	8	2	—	—	—	—	—	—	—	7.2	0.4	10	
August	1007	84	71	92	64	81	—	—	4	12	8.8	12	9	14	14	10	12	15	14	10	2	—	—	—	—	—	—	—	6.8	0.5	3	
September	1013	76	61	85	52	74	—	—	6	9	4.3	9	17	21	12	8	6	8	11	15	2	—	—	—	—	—	—	—	6.6	0.3	1	
October	1019	66	50	76	38	69	—	—	9	6	1.6	7	19	15	9	8	7	8	12	21	1	—	—	—	—	—	—	—	6.8	0.2	0.9	
November	1023	51	36	65	21	67	—	—	9	5	1.6	9	21	14	10	11	9	4	9	21	1	—	—	—	—	—	—	—	8.9	0.9	0.9	
December	1025	37	24	52	8	66	—	—	9	5	1.1	9	28	16	10	10	6	2	6	21	1	—	—	—	—	—	—	—	8.7	0.5	1	
Means	1017	59	45	—	—	72	—	—	81	106	40.8	105	16	12	9	9	11	12	12	18	1	—	—	—	—	—	—	—	7.9	—	—	—
Totals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of observations	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Observations at 0200, 0600, 1000, 1400, 1800 and 2200, 135° E. meridian time.
†Highest recorded temperature. ††Lowest recorded temperature.

During a period of 20 minutes before any hour of observation.

Authorities:—MS. data supplied by Meteorological Observatory,
Zinsen.

Zinsen, Results of Meteorological Observations in
Työsen, Lustrums 1921-5, 1926-30.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

CHAPTER II

FOKAI POINT TO HSIA-MEN, INCLUDING SHAN-T'OU CHIANG AND
HSIA-MEN CHIANG*Chart 1962.*

COAST.—Bias bay to Shan-t'ou chiang.—**General remarks.**—From Fokai point, situated on the eastern side of the approach to Bias bay, also known as Ta-ya wan and described in China Sea Pilot, Vol. I., the coast trends generally east-north-eastward for about 115 miles to Shan-t'ou chiang. This section of the coast is indented by several large bays and inlets. The greater part of the coast is of moderate elevation.

Currents.—**Caution.**—On the southern coast of China, the current during the north-east monsoon runs almost constantly west-south-westward nearly parallel to the coast at a rate of from 18 to 48 miles a day, according to the strength of the wind, and sometimes, when a typhoon or storm occurs, its rate is greatly increased. In the height of the south-west monsoon, the current runs east-north-eastward at a rate of 15 to 22 miles a day. On occasions during both monsoons, inshore sets of considerable strength have been experienced along this coast.

Chart 3002.

Coast.—**Dangers.**—**Signal station.**—Fokai point (*Lat.* 22° 33' N., *Long.* 114° 55' E.) is the south-eastern extremity of a promontory, 670 feet (204^m2) high, connected to the mainland by a low, sandy isthmus; from a distance the promontory appears as an island when seen from eastward or westward. A fort stands on a hill on the south-western extremity of the promontory. Three rocky islets lie off the eastern side of the isthmus.

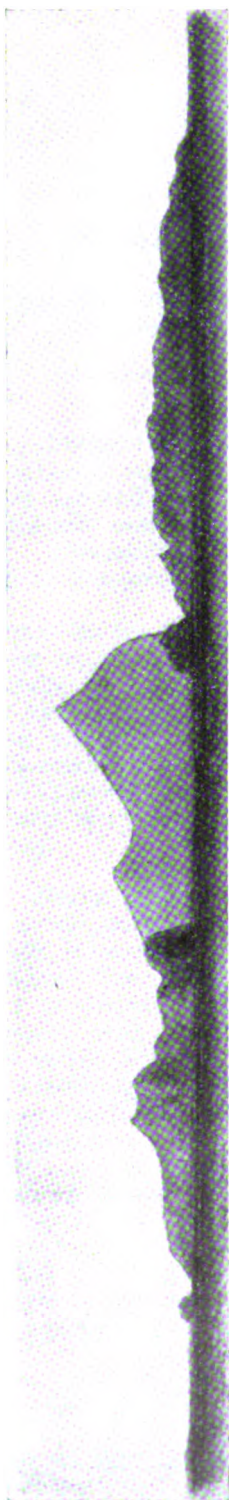
A signal station, consisting of a circular tower with a white mast in front of it, is situated on the promontory and about one mile west-north-westward of Fokai point; this tower is prominent on bearings between east and north, as it is then on the skyline, but it is obscured on bearings between north and west.

A rock, with a depth of less than 6 feet (1^m8) over it, lies 3 cables north-eastward of the northern of the three rocky islets mentioned above, and a reef, awash, lies about three-quarters of a mile east-north-eastward of the same islet. A sunken rock lies nearly 7 miles north-north-eastward of Fokai point and about 1½ miles offshore.

From Fokai point, the coast trends about 9 miles north-north-eastward to the entrance to San-chou inlet.

Charts 3026, 2661b, 1262, 1263.

To face page 81.



Fokai point.

*Harlem peak, bearing about 017°, distant 30 miles.
Fokai point and adjacent coast from southward.
(Original dated 1845.)*

Chart 3002.

Harlem peak or Kuan-yin shan, situated nearly 8 miles northward of Fokai point, is 2,070 feet (630^m) high and prominent. See view facing this page.

Chart 3026.

Outlying islet and dangers south-eastward and eastward of Fokai point.—Pedro Blanco or Tai-sing-cham (*Lat. 22° 19' N. Long. 115° 07' E.*) is a rocky islet lying about 18 miles south-eastward of Fokai point; it has a white summit, 130 feet (39^m) high, and, when seen from southward, it appears as two rocks. See view.



Pedro Blanco, bearing 174°, distant 2½ miles.

(Original dated 1935.)

Whale rock, awash, and on which the sea sometimes breaks, lies about 6½ miles east-south-eastward of Fokai point; it is in two parts and is steep-to.

Pauk-piah, situated about 2½ miles northward of Whale rock, is a flat rock about 25 feet (7^m) high.

Chart 3459.

San-chou inlet.—Islets and dangers.—Caution.—The southern entrance point to San-chou (Sam-chau) inlet is low and flat, except for a small hillock on it, named Tung-pan shan; Hsi-hu islet, or Entrance island, lies 1½ cables eastward of this point, with drying reefs between; an 18-foot (5^m) patch lies about half a cable north-eastward of the eastern extremity of this island. Wan-tsu shan is a hill, 360 feet (110^m) high, lying near the coast about 6 cables west-south-westward of Tung-pan shan.

Tung-hu islet, or Coast island, lies about three-quarters of a mile eastward of Yen-tun (Tung-ching) chüeh, the north-eastern entrance point, and is fringed by a narrow reef; there are some reefs between this island and Yen-tun chüeh. Yen-tun (Tung-ching) ling, 337 feet (102^m) high, and Tung-hu-ya shan, 266 feet (81^m) high, are hills near the coast on the north-eastern side of the entrance.

Wai-chia, or Outer bank, is a bank extending about half a mile southward from Yen-tun chüeh; it was reported, in 1906, to be extending. Fei-hoo is a bank, with a least known depth of 9 feet (2^m) over it, lying about three-quarters of a mile south-eastward of Yen-tun chüeh. The bottom on both these banks is rocky. Nei-chia, or Inner bank, is a bank lying westward of Yen-tun chüeh; the deepest and widest channel lies along the eastern side of this bank.

Considerable changes were reported, in 1907, in the depths in the entrance channel.

From Tung-pan shan (*Lat. 22° 41' N., Long. 114° 58' E.*) the western shore of the inlet trends northward for about one mile to Tu-ti chüeh, and then turns abruptly westward. Shwang-tu shih is a hill, 102 feet (31^m) high, near the western shore abreast of Yen-tun chüeh.

Tung-p'ao-t'ai and Hsi-p'ao-t'ai are points situated nearly opposite each other on the northern and southern sides, respectively, of the inlet, about half a mile above Tu-ti chüeh; there is a ruined fort on each of these points. A patch, with a least depth of 16 feet (4^m) over it, lies near mid-channel about one cable east-north-eastward of Hsi-p'ao-t'ai.

Charts 2661b, 1262, 1263.

Chart 3459.

A-mo-miao is a temple situated on the southern shore about 2 cables westward of Hsi-p'ao-t'ai, and just above it is the entrance to Ao-wei chiang, or Joss House bay.

- 5 **Pai-hu chou (chau)** is an islet situated about one mile further up the inlet, off the southern end of the large island Ta chou (chau). Here the inlet bifurcates, the eastern channel being called San-chou (Sam-chau) reach, and the western Ta-chou (Ta-chau) reach.

- Directions.—Anchorages.**—Vessels should not enter San-chou inlet
10 without local knowledge, and, as the tidal streams may attain a rate of 5 knots, it is advisable to enter at high water. The following directions, used in 1930, may assist the mariner, but it should be borne in mind that considerable change may have taken place to the banks at the entrance, and also further inside, since that date.
- 15 From a position about half a mile south-eastward of Hsi-hu islet, steer for Yen-tun chüeh, bearing 338° , subsequently steering a west-north-westerly course so as to pass fairly close north-eastward of Hsi-hu islet. When the summit of Hsi-hu islet bears 179° , keep it
20 astern on that bearing, which leads between Wai-chia and Nei-chia banks. After passing Yen-tun chüeh, a mid-channel course should be steered until between Tung-p'ao-t'ai and Hsi-p'ao-t'ai. After rounding Tung-p'ao-t'ai, steer for the summit of Pai-hu chou, bearing 323° .

Good anchorage can be obtained, in depths of from 5 to 6 fathoms
25 (9^m1 to 11^m0), in a position about $3\frac{1}{2}$ cables below Pai-hu chou.

There is also anchorage in San-chou reach, in a position about $2\frac{1}{2}$ cables north-north-eastward of Pai-hu chou.

Chart 3026.

- Outlying islets and dangers off San-chou inlet.**—Tung-ting, situated
30 about $7\frac{1}{2}$ miles east-south-eastward of the entrance to San-chou inlet, is a rocky islet, about 50 feet (15^m2) high, with above water and sunken rocks around; the sunken rocks lie up to a distance of nearly half a mile southward and south-eastward of the islet (*Lat.*
 $22^{\circ} 38' N.$, *Long.* $115^{\circ} 06' E.$).

- 35 Si-ting lies about $1\frac{1}{2}$ miles north-westward of Tung-ting and is a similar islet.

- Sunk rock, with a depth of less than 6 feet (1^m8) over it, lies about $1\frac{1}{2}$ miles north-westward of Si-ting, and the sea often breaks on it. Mace point, situated at the head of Hong-hai bay (chart 1962),
40 open north-westward of Chi-hsin shih (Hat island), described below, bearing about 053° , leads north-westward of Sunk rock.

- Single rock, situated about 4 miles eastward of Sunk rock, is awash and the sea only breaks on it at low water or when there is a heavy sea. A rock, with a depth of 2 fathoms (3^m7) over it, lies about half
45 a mile north-eastward of Single rock.

- Coast.**—From the entrance to San-chou inlet, the coast trends about $3\frac{1}{2}$ miles east-north-eastward to Ross head, which rises about one mile inland to Ross peak, or Hung-wu ling, 1,017 feet (309^m0) high.

- 50 *Charts 3026, 1962.*

Hong-hai bay.—Caution.—Islands and dangers.—Anchorages.—

Directions.—Hong-hai bay lies between Ross head and Chou-pa wei (Tsiech point), situated about 20 miles eastward and its shores are indented by several shallow inlets. Caution is necessary when

Charts 3026, 1962.

approaching this bay at night in fine weather, as it is then usually crowded with fishing junks; there is usually a long ground swell.

Owing to the imperfect nature of the survey of Hong-hai bay and its approaches, great caution must be exercised when navigating northward of the line joining Fokai point and Chou-pa wei, as further dangers may exist. 5

Chart 3026.

Pai-sha shan (Inside island), 460 feet (140^m2) high, lies about 5½ miles north-eastward of Ross head and three-quarters of a mile offshore; some detached rocks lie up to 3 cables south-westward of its southern extremity, and a rocky patch, with a depth of less than 6 feet (1^m8) over it, lies 4 cables eastward of the island. A large stream, with a depth of 6 feet (1^m8) over the bar, flows into the bay about 3 miles westward of Pai-sha shan. 15

Chart 1962.

Chi-hsin shih (Hat island), situated about 2½ miles south-eastward of Pai-sha shan, is a peaked rock with detached rocks around. Hong-hai or Chiang-wu-ling, an island 240 feet (73^m1) high, situated nearly 2½ miles eastward of Chi-hsin shih, affords some shelter from southerly winds on its northern side, in a depth of 4 fathoms (7^m3); two rocks, which dry, lie about 3 cables south-south-eastward of its south-eastern point. 20

Shoal bay, lying in the middle of the northern shore of Hong-hai bay, is enclosed by two large peninsulas projecting into Hong-hai bay, and is entered between Mace point, 380 feet (115^m8) high, situated about 2 miles northward of Hong-hai, and Club point, 370 feet (112^m8) high, lying about 2½ miles eastward; the general depths in this bay are less than 2 fathoms (3^m7). There is an inlet in the north-eastern part, from which a channel, navigable for small boats, communicates with Chieh-shih wan (page 85). Shoal bay affords protection from northerly winds; vessels entering should pass close to Club point, and anchor when a fishing village on the shore of the bay is sighted. 30

From Club point (*Lat. 22° 47' N., Long. 115° 14' E.*), the coast trends eastward for about 7 miles to the entrance to Tai-sami inlet, which, together with its approaches, is described below. Tai-sami head is situated about 2 miles southward of the entrance to Tai-sami inlet. 35

In the north-east monsoon, sheltered anchorage can be obtained westward of Tai-sami head, but a long, heavy swell rolls in. Ta-mao shan (Tai-sami mound) is an artificial cone, 970 feet (295^m7) high, situated on the highest part of the hills about 2 miles north-westward of Chou-pa wei, which lies about 3½ miles south-eastward of Tai-sami head. 40

Tidal streams.—Strong tidal streams, setting northward or southward according as the tide is flooding or ebbing, have been observed when passing Hong-hai bay. 45

Chart 1962, plan of Tai Sami.

Tai-sami inlet and approaches.—**Dangers.**—**Beacons.**—**Directions.**—Tai-sami inlet penetrates the eastern shore of Hong-hai bay, and the entrance channel, situated 7 miles eastward of Club point, is about half a mile wide, with a least depth, in 1947, of about 10 feet (3^m0) in the fairway. The northern side of the approach is shoal, and Anlan 50

Chart 1962, plan of Tai Sami.

rocks, which dry, lie about $1\frac{1}{2}$ miles north-westward of Fort point, the southern entrance point of the inlet. Anlan rocks are marked by a red steel framework beacon, and there is another beacon situated 5 about 8 cables further south-eastward. Entrance hill, situated just within Fort point, rises to an elevation of 247 feet (75^m3). In 1953, the sandy spit lying about 3 cables westward of Fort point was reported to have extended northward.

A sandbank, with depths of less than 2 fathoms (3^m7) over it, 10 extends fully $1\frac{1}{2}$ miles westward from Fort point, and closes the shore near Tai-sami head (chart 1962); a 5-foot (1^m5) patch lies just within the north-western extremity of this bank, and less water was reported westward of it, in 1927.

Northward of Fort point, the depths in the channel increase to 4 15 fathoms (7^m3) and over, but its width decreases to about $1\frac{1}{2}$ cables; within the entrance, for over one mile near the southern shore of the inlet, there are depths of from 3 to 6 $\frac{1}{2}$ fathoms (5^m5 to 12^m3). There is a Roman Catholic church and a post office at Shan-wei (Tai-sami), a settlement on the northern side of the entrance; it is also connected 20 to the telephone system.

To enter, a vessel should pass about 2 cables southward of Anlan Rocks beacon; strangers are advised to employ a pilot.

Chart 1962, plan of Goat island.

Kuei-ling-chou anchorage.—Kuei-ling chou (Goat island), 175 feet 25 (53^m3) high, situated about 8 miles south-eastward of Chou-pa wei, lies near the extremity of a rocky spit extending fully $1\frac{1}{2}$ miles southward from the coast about 2 miles eastward of that point; foul and rocky ground extends about 6 cables southward of the island, and a rock, which just uncovers, lies about $1\frac{1}{2}$ miles south- 30 westward of the western point of the island.

Green islet lies about 6 cables northward of Kuei-ling chou (*Lat.* 22° 40' N., *Long.* 115° 26' E.), and is the northernmost of several small islets situated near the extremity of the rocky spit.

In the north-east monsoon, fairly sheltered anchorage can be 35 obtained between Chou-pa wei and Kuei-ling chou.

Charts 958, 1962.

Coast.—Anchorage.—Caution.—From a position on the shore northward of Kuei-ling chou, the coast trends about 8 miles east-south-eastward to Che-lang chiao.

40 Chieh-sheng (Chiap-ch'eng) or Chieh-sheng-so-ch'eng-ko is a walled town situated about $3\frac{1}{2}$ miles north-eastward of Chou-pa wei and $1\frac{1}{2}$ miles inland.

Che-lang chiao consists of red sand and rugged rock; a conspicuous boulder, 103 feet (31^m4) high, stands a quarter of a mile northward 45 of the point. The land for some distance on either side of Che-lang chiao is a remarkable red colour, with black mounds.

P'ao-t'ai shan, a small hill on which there is a fort, lies about three-quarters of a mile north-westward of Che-lang chiao.

Che-lang piao, an islet 110 feet (33^m5) high, is separated from 50 Che-lang chiao by a narrow passage, which is not navigable. During the north-east monsoon there is good anchorage 2 cables westward of Che-lang chiao, in depths of from 6 to 7 fathoms (11^m0 to 12^m8), sand and mud, but caution must be exercised, as the tidal streams are strong, and the depths decrease rapidly close inshore; the

Charts 958, 1962.

conspicuous boulder, which has a whitewashed mark on it, in line with a smaller boulder south-westward, bearing 044° , leads to the anchorage. The lighthouse on Che-lang piao in line with a whitewashed boulder close below it, bearing about 132° , is a mark for letting go the anchor. 5

Chart 958.

Light.—A light is exhibited, at an elevation of 112 feet (34^m2), from a steel framework structure, on the summit of Che-lang piao (*Lat. $22^{\circ} 39' N.$, Long. $115^{\circ} 34' E.$*). 10

Chart 1962.

Off-lying islets and dangers.—Numerous dangers lie off the coast between Kuei-ling chou and Che-lang chiao, and only the outer ones will be described. A rock, and a sunken rock, on which the sea breaks, lie about one mile and $1\frac{1}{4}$ miles, respectively, eastward of Kuei-ling chou. 15

Reef islets or Ts'ai hsü lie about 3 miles south-eastward of Kuei-ling chou, and are surrounded by reefs to a distance of from one to 2 cables.

Middle reef, awash, lies about midway between Kuei-ling chou and Che-lang chiao and about one mile offshore. The passage inshore of this reef should not be attempted. 20

Chart 958.

Shui-ya shih, about 10 feet (3^m0) high, lies $1\frac{1}{4}$ miles westward of Che-lang chiao; there are sunken rocks and rocks above water between it and the coast northward. 25

Chieh-shih wan.—**General remarks.**—**Coast.**—Chieh-shih wan is entered between Che-lang chiao and Tongmi point, situated about $14\frac{1}{4}$ miles east-north-eastward, and has depths of about 10 fathoms (18^m3) at the entrance, decreasing regularly towards the shore. The shores are densely populated, Chieh-shih on the eastern side, being the principal place. In moderate weather the bay and its approaches are crowded with fishing boats. 30

The land at the head of the bay is mostly flat and swampy, and two rivers discharge here. Ch'eng-pu shan and Ta-te ling, 1,773 and 1,546 feet (540^m4 and 471^m2) high, respectively, are summits of a range on the western side of the bay. Two ranges of hills rise within the north-eastern shore, terminating westward in the well-defined Shih shan, 1,439 feet (438^m6) high, and south-eastward in Chin-ting shan, 949 feet (289^m3) high. 40

Hou-t'ou (H'u-t'ou) shan is a hill at the eastern extremity of a promontory situated about one mile northward of Che-lang chiao, which is connected to Pai-sha pan-tao, about 4 miles northward, by a sandy beach, near the middle of which is a group of black boulders, called Wu shih. 45

Paukshao point, situated on the western side of the bay, and about 6 miles northward of Che-lang chiao, is the north-eastern extremity of Pai-sha pan-tao; Paukshao hill, 238 feet (72^m5) high, lying about half a mile south-westward of Paukshao point, is the highest point of this peninsula. Pai-sha hu, situated on the north-western side of this peninsula, is shallow, and a large area at its head dries; it is encumbered with numerous rocks and islets, the most important being Gleig islets, 80 feet (24^m4) high, lying close off the north-western shore and about 3 miles north-westward of Paukshao point. 50

Charts 2661b, 1262, 1263.

Chart 958.

Yen Chiang or Li Chiang is the western of the two rivers at the head of the bay; Wu-k'an Chiang is the eastern river.

Chin-hsiang chiao, situated 8 miles north-eastward of Paukshao point, is formed by Hu-wei shan, a conspicuous hillock, 156 feet (47^m5) high. There are numerous villages in the neighbourhood.

Chino bay lies between Chin-hsiang chiao and a point lying about 1½ miles north-westward of Tongmi point; it is encumbered by numerous scattered rocks and shoals, described below, and the muddy discoloration of the water prevents many of them being seen. Landing can be effected in most parts of the bay during the north-east monsoon. A prominent block of granite, elevated 60 feet (18^m3), stands on a hummock on the shore nearly 4 miles northward of Tongmi point (*Lat.* 22° 45' N., *Long.* 115° 49' E.).

There is a small cove at the southern end of Chino bay, in which there is a fort called Ch'ien-ao-p'ao-t'ai.

Tongmi point is the southern extremity of a promontory rising to its greatest elevation in T'ien-wei shan, 432 feet (131^m7) high, a prominent, sharp, rocky summit situated close to the coast about one mile north-westward of Tongmi point.

Islands and dangers.—Tung-kua hsü, 50 feet (15^m2) high, is the largest of a number of islets and rocks which lie within about half a mile of the coast on the north-eastern side of the peninsula terminating in Che-lang chiao. A 5-fathom (9^m1) rock lies about half a mile offshore east-south-eastward of the eastern extremity of this peninsula.

Chin hsü, situated nearly 4 miles north-eastward of Che-lang chiao, is rugged and terminates northward in a precipitous rocky summit, 87 feet (26^m5) high; a rocky islet, 60 feet (18^m3) high, lies about a cable eastward of its northern end.

White rock, with foul ground around, lies nearly 1½ miles southward of Paukshao point and 3 cables offshore; a rock, with a depth of 1½ fathoms (3^m2) over it, lies 1½ cables northward of this point.

On the northern side of Chino bay, there is much foul ground and several remarkable precipitous rocks, including West White stone, 65 feet (19^m8) high, situated about 2½ miles south-eastward of Chin-hsiang chiao, East White stone, 64 feet (19^m5) high, with perpendicular sides, Double stone, 39 feet (11^m9) high, and Tung-lo; Yellow stone, 43 feet (13^m1) high, lies nearly 2¼ miles south-eastward of West White stone. West White stone, East White stone and Yellow stone show up prominently when approaching from southward. Sarah Lucy rocks, lying 1½ miles south-eastward of Yellow stone, are two pinnacles with a depth of 2 feet (0^m6) over them, on which the sea seldom breaks. Bassard rock, situated nearly 1½ miles southward of Yellow stone, is a pinnacle with a depth of 6 feet (1^m8) over it, and does not break. Arnold rocks, lying about half a mile south-eastward of Bassard rock, consist of two pinnacles, one cable apart, each having a depth of 2½ fathoms (4^m6) over it. Chino reef, partly awash, extends nearly 3 cables from the coast about 1¼ miles north-westward of Tongmi point.

Hsi-chieh chiao (*Lat.* 22° 42' N., *Long.* 115° 47' E.), situated about 3 miles south-westward of Tongmi point, is a rugged islet with two granite hummocks. A 6-fathom (11^m0) patch lies fully one mile southward of Hsi-chieh chiao, and the vicinity should be avoided,

Chart 958.

as the rocks off this coast are of a pinnacle nature. Simpson rock, situated half a mile north-westward of Hsi-chieh chiao, has a least depth of 3 fathoms (5^m5) over it.

Anchorage.—Directions.—Anchorage, protected except from southerly winds, can be obtained in Chieh-shih wan, choosing a berth on either side of the bay according to the prevailing monsoon; vessels of deep draught, however, must anchor well out in the bay. During the north-east monsoon the swell is felt throughout the bay.

There is good anchorage for vessels of moderate draught north-westward of Paukshao point, protected except from northerly and easterly winds.

Vessels not exceeding 10 feet (3^m0) in draught can anchor half a mile north-westward of Chin-hsiang chiao.

During the north-east monsoon, there is good anchorage for vessels of light draught in Chino bay, with Yellow stone bearing 280°, distant about 8 cables, in depths of from 3 to 4 fathoms (5^m5 to 7^m3), mud. In order to avoid Arnold rocks and Bassard rock, a vessel should approach this anchorage by steering for Yellow stone bearing more than 000° until three-quarters of a mile from it, then steer north-eastward for the anchorage. There is also convenient anchorage for vessels of light draught, during the north-east monsoon, about 1½ miles north-westward of T'ien-wei shan.

Coast.—Dangers.—Caution.—From Tongmi point, the coast trends about 5½ miles north-eastward to Black Rock point, and consists of a sandy plain.

Tung-chieh chiao, situated about 1½ miles south-eastward of Tongmi point, consist of several black rocks, the highest being 20 feet (6^m1) high. Suwonada rock, lying about three-quarters of a mile south-eastward of Tongmi point, is a pinnacle with a depth of 2½ fathoms (4^m6) over it. A group of rocks above water, one of which, Thumb rock, is 15 feet (4^m6) high, lies about half a mile eastward of Tongmi point. Vessels should not attempt to pass between Tung-chieh chiao and the coast northward.

Black Rock point (*Lat.* 22° 47' N., *Long.* 115° 54' E.) can be distinguished by a conspicuous mound, 105 feet (32^m0) high, in its vicinity; Black rock, 30 feet (9^m1) high and prominent, lies 1½ cables off the point. Parry rocks, lying about 1¾ miles south-westward of Black Rock point and one mile offshore, have a least depth of 2 fathoms (3^m7) over them. An isolated rock, with a depth of 6 fathoms (11^m0) over it, lies about one mile southward of Parry rocks.

Chart 1962.

Hutung point, situated about 2¾ miles eastward of Black Rock point, has a fort on it, and close to the fort is a prominent dome-shaped building like a large beehive; *see* view on chart 1962. Close westward of the point is the mouth of Hutung river, which has a depth of 6 feet (1^m8) over the bar. A small islet, surrounded by reefs and rocks, lies about one mile south-eastward of Hutung point, one of these rocks, named Figure rock, is peculiar in shape when seen from eastward.

Chart 811, plan of Chia-tzu chiang.

Hutung peak, 715 feet (217^m9) high, situated about 3 miles north-eastward of Hutung point, and Knob peak, 681 feet (207^m6) high, lying a short distance further north-eastward, are prominent; *see*

Chart 811, plan of Chia-tzu chiang.

view facing page 95. A ridge of hills runs south-eastward to the coast from Hutung peak.

A flat rock, 9 feet (2^m7) high, with sunken rocks around, lies nearly 5 $1\frac{1}{2}$ miles south-eastward of Hutung peak and half a mile offshore. The coast for about $2\frac{1}{2}$ miles eastward of the flat rock is fringed by rocks above water and sunken rocks; the outermost of these, with a depth of less than 6 feet (1^m8) over it, lies nearly 2 miles east-north-eastward of the flat rock and 8 cables offshore.

10 **Chia-tzu chiang.—Anchorage.—Dangers.**—Chia-tzu chiao is situated about 8 miles eastward of Hutung point (chart 1962) and has a rugged summit; a ruined fort stands on the coast about 3 cables north-westward of the point.

Kupchi islet, 70 feet (21^m3) high, lies about 4 cables southward of 15 Chia-tzu chiao, with foul ground between; some rocks above water and sunken rocks lie within a distance of half a mile southward and eastward of the islet. Turtle rock, 15 feet (4^m6) high, lies about one mile southward of Kupchi islet, and two rocks above water lie about 4 cables northward and north-eastward of Turtle rock, respectively. 20 Balfour rock, with a least depth of $2\frac{1}{2}$ fathoms (4^m6) over it, lies nearly $1\frac{1}{2}$ miles south-eastward of Kupchi islet, and a $4\frac{1}{2}$ -fathom (7^m8) patch lies a quarter of a mile westward of Balfour rock. The bottom in this locality is very uneven, and vessels should pass not less than half a mile southward of Turtle rock and Balfour rock.

25 A river, on the western side of which is the walled town of Chia-tzu discharges about 2 miles north-north-westward of Chia-tzu chiao. There are two forts on the eastern side of the entrance, and one on the western; a two-storied pagoda stands inside the entrance and about one mile northward of the western fort. Shag rock (*Lat.* 22° 30' N., *Long.* $116^\circ 05'$ E.), situated about 7 cables southward of the western fort, is 4 feet (1^m2) high; a $1\frac{1}{2}$ -fathom (2^m7) patch lies about half a mile westward of the rock.

During the north-east monsoon small vessels can obtain anchorage about 4 cables south-westward of Shag rock, but there is usually a 35 heavy ground swell.
Chart 1962.

Coast.—Dangers.—The coast between Chia-tzu chiao and Ao-chiao village, situated about 15 miles north-eastward, is low and sandy. Black mount, lying about 4 miles north-westward of Chia-tzu chiao, 40 is a black conical hill rising from red sand dunes (*see* view facing page 95); it is a prominent landmark and can often be seen at night. Reefs extend half a mile from the coast in its vicinity.

In December, 1904, the s.s. *Workfield*, drawing 24 feet (7^m3), reported having struck an obstruction, probably a rock, lying about 45 $4\frac{1}{2}$ miles south-eastward of Chia-tzu chiao; the position is doubtful. *Chart 811, plan of Lien-hua-feng anchorage and Shen-ch'üan chiang.*

Shen-ch'üan chiang.—Dangers.—Anchorage.—A river flows into the sea about 14 miles north eastward of Chia-tzu chiao; the sea breaks on its bar at low water. A pagoda stands on a hill about 2 50 miles northward of the eastern entrance point. Ao-chiao village is situated on the coast about one mile south-eastward of the eastern entrance point of the river.

White rock, situated about $3\frac{1}{2}$ miles south-eastward of the eastern entrance point of the river and a quarter of a mile offshore, is 20 feet

Chart 811, plan of Lien-hua-feng anchorage and Shen-ch'üan chiang. (6^m1) high, with a white top, and is prominent when seen from south-westward. Hai-lung, a rock with a depth of 1½ fathoms (2^m7) over it, lies about 1½ miles southward of White rock.

Shen-ch'üan chiang affords fairly good anchorage in the north-east monsoon, with good holding ground, but a heavy swell often sets in from southward. The best position is with the pagoda near the entrance of the river bearing 348°, in a depth of 5½ fathoms (9^m6).

Lien-hua-feng anchorage.—Dangers.—Directions.—Lien-hua-feng chiao is situated about 8½ miles eastward of Ao-chiao village; Dome hill, 111 feet (33^m8) high, rises from a red sand dune on the point; Round hill, 380 feet (105^m8) high, is situated about 2½ miles northward of the point. See view on chart 1962.

Lien-hua-feng chiao and the coast immediately eastward is fringed by above water and sunken rocks, including one 25 feet (7^m6) high, up to a distance of half a mile, and similar dangers extend nearly 2 miles south-westward from the point; Korea rock, with a depth of 2 fathoms (3^m7) over it, lies about 2 miles south-westward of the point, near the outer end of the latter dangers. Sunk rock, with a depth of 7 feet (2^m1) over it, lies about half a mile north-north-westward of Korea rock, and foul ground extends nearly half a mile west-north-westward from the former. Black rock, 10 feet (3^m0) high and Flat rock, 8 feet (2^m4) high, lie about three-quarters of a mile north-north-eastward and north-eastward, respectively, of Korea rock. The 25-foot (7^m6) rock off Lien-hua-feng chiao in line with the lighthouse on the point (*see below*), bearing 055°, leads close south-eastward of the dangers extending south-westward from Lien-hua-feng chiao; at night Lien-hua-feng-chiao light should bear less than 050°.

An islet, 52 feet (15^m8) high, lies about 2 miles westward of Lien-hua-feng chiao and half a mile offshore.

In the north-east monsoon, fairly good anchorage can be obtained half a mile west-south-westward of the 52-foot (15^m8) islet, in a depth of 5½ fathoms (10^m1), with Dome hill in line with the islet, bearing about 076°. A vessel approaching this anchorage from southward should steer for a remarkable square stone, situated on the coast about 3½ miles westward of Lien-hua-feng chiao, bearing more than 320°, which will lead westward of Korea and Sunk rocks. It was reported, in 1939, that the remarkable square stone was difficult to identify.

Light.—Fog signal.—A light is exhibited, at an elevation of 145 feet (44^m2), from a steel framework tower, situated about three-quarters of a mile eastward of Lien-hua-feng chiao. A fog signal is occasionally sounded from the lighthouse (*Lat.* 22° 56' N., *Long.* 116° 30' E.).

Chart 1962.

Coast.—Dangers.—Tong-lai point is situated about 4 miles north-eastward of Lien-hua-feng chiao, and nearly 1½ miles further north-eastward is Rocky point; numerous rocks above water and sunken rocks lie off the coast between these two points, the outermost being a sunken rock about 6 cables south-eastward of Tong-lai point.

About one mile westward of Tong-lai point is the entrance to a creek leading to the walled town of Ching-hai (Tong-lai); on the eastern side, near the entrance, is a remarkable dome-shaped tower and a low, square fort.

Charts 1968, 2661b, 1262, 1263.

Chart 1962.

A headland, fringed by reefs, is situated about $4\frac{1}{2}$ miles northward of Rocky point, and Hai-men wan (Haimun bay) lies between it and Hai-men chiao (Haimun point), situated about 7 miles north-eastward. On the summit of a hill, 600 feet (182^m9) high, situated about $1\frac{1}{2}$ miles northward of Hai-men chiao, is an artificial mound. A pagoda stands on a hill about $6\frac{1}{2}$ miles northward of Hai-men chiao, and another on a hill about $7\frac{1}{2}$ miles north-north-westward of the same point. West peak is situated about $2\frac{1}{2}$ miles westward of the western pagoda. Hai-men chiang, with a depth of 10 feet (3^m0) on the bar, flows into the northern part of Hai-men wan; on the eastern bank, about one mile within the entrance, is the town of Hai-men (Haimun), and northward of the town the river turns westward. There is communication by a channel with Y'o chiang (page 91). Hai-men wan is not recommended as an anchorage, but sailing vessels beating against the north-east monsoon may sometimes find it convenient to anchor there, to avoid being driven back round Lien-hua-feng chiao.

Parkyns rock, situated about one mile south-south-westward of Hai-men chiao, is divided into two parts; the sea only breaks on them when there is a heavy swell. A rock, awash, lies about 9 cables south-westward of the eastern entrance point of Hai-men chiang.

Caution.—In thick weather, when neither the low white sandy shore of Ch'i-wang wan (Hope bay) (*see* below) nor Nan-ao tao (Namoa island) (page 100) have been visible, vessels have on many occasions mistaken Hai-men chiao for Hao-wang chiao (Good Hope cape) (page 91); the point and the cape much resemble each other, both having three distinct high points with sandy beaches between. *Charts 1957, 1962.*

Ch'i-wang wan.—Dangers.—Anchorage.—Ch'i-wang wan (Hope bay) lies between Hai-men chiao and Tide point, situated about 8 miles north-eastward; during the rising tide there is often a heavy tide race off the latter point. The western shore of the bay must be given a berth of fully one mile, as detached rocks lie within this distance for about $3\frac{1}{2}$ miles northward of Hai-men chiao.

Peaked rock (point) lies off the western entrance point of a small bay lying close westward of Tide point (*Lat.* $23^{\circ} 13' N.$, *Long.* $116^{\circ} 47' E.$), and 4 cables south-westward of this rock is Cockchafer rock, a pinnacle with a depth of 4 feet (1^m2) over it. A fort, with a large tree near it, stands on the eastern entrance point of this bay, and sunken rocks extend one cable from this point. Secure anchorage can be obtained in this bay during the north-east monsoon by vessels with local knowledge.

Chart 854.

Ta-ta-pu creek, which separates Ta-hao tao from the mainland westward, is entered about $1\frac{1}{2}$ miles north-westward of Peaked rock, and runs north-westward to unite with Y'o chiang; the creek has a depth of $1\frac{1}{2}$ fathoms (2^m3) over the bar at the entrance. A ruined fort stands on a hill on the eastern side of the entrance. A reef extends nearly 3 cables from the coast close southward of the fort. East islet and West islet are situated off the entrance to the creek, and Tortoise island lies about $1\frac{1}{2}$ miles above the entrance.

Passage over the bar requires great caution, and the channel is narrow and intricate throughout. Large fishing junks approach with

Charts 1968, 2661b, 1262, 1263.

Chart 854.

the entrance on a north-easterly bearing, and pass close south-eastward of East islet.

Chart 1957.

Coast.—From Tide point the coast trends about 2 miles north-eastward to Hao-wang chiao, and Ma-erh chiao lies about three-quarters of a mile from Tide point.

Chart 1962.

Off-lying shoal depths.—A depth of 17 fathoms (31^m1) was reported, in 1885, by H.M.S. *Constance*, in a position about 32 miles southward of Lien-hua-feng chiao (page 89).

Depth of less than 20 fathoms (36^m6) were reported, in 1907, by U.S.S. *Helena*, with a least depth of 10 fathoms (18^m3) in a position about 60 miles south-eastward of Hao-wang chiao. The position is considered to be doubtful.

15

*Charts 854, 1957, 1962.***SHAN-T'OU CHIANG AND APPROACHES.—General remarks.—**

Port limits.—Depths.—Shan-t'ou chiang, formerly known as Port Swatow, is situated at the entrance to Y'ou chiang and was opened to foreign trade by the Treaty of Tientsin in 1858; it is the shipping port of Ch'ao-an (Chau-chu-fu), one of the principal cities of the province of Kwang-tung. A branch of Han chiang runs from Ch'ao-an to Shan-t'ou, but it is only navigable by flat-bottomed boats.

The town of Shan-t'ou (*Lat. 23° 21' N., Long. 115° 40' E.*) lies on the northern side of the estuary about 5 miles from its entrance. Above the town, the estuary opens out into a wide basin, largely filled with shallow banks and flats.

The eastern limit of the port is formed by the meridian through the eastern extremity of Lu hsü (page 93), and the western limit by the meridian through Ta-hao tsui (page 95), situated nearly 6 miles westward.

The depths in the approach to Shan-t'ou chiang are liable to change, but a depth of 13 feet (4^m0) can usually be carried over The Bar (*see* page 93). In 1945, a depth of 15 feet (4^m6) was available in a channel 3½ cables wide on the recommended leading line across The Bar. In 1952, the least depth on The Bar was reported to be 14 feet (4^m3). At high water, Shan-t'ou can be reached by vessels with a draught of 7½ feet (2^m3) more than the depth on The Bar at spring tides, and 6 feet (1^m8) at neaps, during the north-east monsoon; in the south-west monsoon the permissible draught is about one foot (0^m3) less.

Chart 854.

Approaches.—Coast.—Dangers.—Hao-wang chiao, or Piao chiao, situated about 2 miles north-eastward of Tide point, is the north-eastern extremity of a hilly peninsula on the south-eastern end of Ta-hao tao, which forms the western side of the approach to Shan-t'ou chiang; the highest part of this peninsula, named Lei-kou shan, is 433 feet (132^m0) high and prominent from south-westward, its top appearing flat and falling sharply on both sides. The northern point of the peninsula is a bold point, which is marked by a fort.

From Hao-wang chiao, the coast trends generally north-westward for about 5½ miles to the entrance to Shan-t'ou chiang; the first 2 miles consist of a low sandy beach.

Charts 1968, 2661b, 1262, 1263.

Chart 854.

Ta chiao is a point situated about $3\frac{1}{2}$ miles north-north-westward of Hao-wang chiao. Hsin-chi shan, a hill situated about $2\frac{1}{2}$ miles north-westward of Ta chiao, is steep on the northern side, but
 5 continues at about the same level for a considerable distance south-eastward. Chien shih is a rock, 25 feet (7^m6) high, lying nearly $1\frac{1}{2}$ miles northward of Ta chiao and barely one cable offshore, on the southern side of the entrance to Shan-t'ou chiang. The coast between a point lying about one mile southward of Ta chiao and Chien shih is
 10 interspersed with conspicuous sandy beaches, and there are several detached rocks some distance offshore; Shuan (Chuan) chiao, the outer rock, is awash, and lies about 6 cables south-eastward of Chien shih.

The coast on the northern side of the entrance to Shan-t'ou chiang
 15 forms part of the delta of Han chiang (river), and consists of low sandhills fronted by extensive sandbanks which partially dry. Sha-chi shan, 20 feet (6^m1) high, lying about 2 miles northward of Chien shih, is the northern entrance point. A stream, called Ku-sha hsi, discharges about one mile north-eastward of Sha-chi shan. Pagoda
 20 hill (chart 1957), situated on the coast about 5 miles north-eastward of Sha-chi shan, appears as an islet; there is a pagoda on its summit, at an elevation of 247 feet (78^m3).

Light.—Fog signal.—A light is exhibited, at an elevation of 171 feet (52^m1), from a white circular tower, 22 feet (6^m7) in height,
 25 situated near the extremity of Hao-wang chiao (*Lat.* $23^\circ 14' N.$, *Long.* $116^\circ 48' E.$). A fog signal is occasionally sounded from the lighthouse.

Islets and dangers in the approach.—Buoy.—Ku shih is a patch of foul ground, with a least depth of 5 fathoms (9^m1) over it, lying about
 30 4 cables eastward of Hao-wang chiao. Lu-hsü lighthouse (page 93) in line with the eastern side of Chih-wen tao (*see below*), bearing 326° leads about one cable north-eastward of these rocks.

Ching tao, 72 feet (21^m9) high, lies about 8 cables north-north-westward of Hao-wang chiao; rocks extend about $1\frac{1}{2}$ cables
 35 north-eastward from the islet, one near the outer end being 2 feet (0^m6) high, and a rocky patch, with several heads from 4 to 12 feet (1^m2 to 3^m7) high, lies between the islet and the coast south-westward.

Chih-wen tao, 50 feet (15^m2) high, lies about $1\frac{1}{2}$ miles north-north-westward of Ching tao. Chih-shih-tzu lying about 3 cables southward
 40 of Chih-wen tao, is a large square rock about 15 feet (4^m6) high; a reef, on which the sea constantly breaks, extends about 3 cables south-westward from this rock. Ou shih, situated about 3 cables south-eastward of Chih-shih-tzu, consists of two patches with depths of $1\frac{1}{2}$ and $2\frac{1}{2}$ fathoms (2^m3 and 4^m6) over them, respectively.

Wu-chiao-erh, a rock which lies nearly $3\frac{1}{2}$ miles north-eastward of Chih-wen tao, has a least depth of one fathom (1^m8) over it. A whistle-buoy, painted in red and black chequers, is moored about 2 cables southward of Wu-chiao-erh. The point northward of Lei-kou
 45 shan in line with the south-eastern side of Ching tao, bearing 219° , leads nearly one mile south-eastward of Wu-chiao-erh; *see view C* on chart 854. The northern extremity of Ma tao (page 93) bearing 289° and just open northward of Lu hsü, leads nearly one mile southward of the rock; *see view A* on chart 854. The northern summit of Chüeh shih (page 94) in line with the southern extremity
 50

Charts 1957, 1962, 1968, 2661b, 1262, 1263.

Chart 854.

of Mu hsü (*see* below), bearing about 274° leads about three-quarters of a mile northward of the rock; *see* view B on chart 854.

Tai-hsia-chin ch'ien-t'an is a bank which extends from the coast northward of the entrance to Shan-t'ou chiang; the south-eastern part, known as Tai-hsia-chin sha-tsui, extends into the fairway of the estuary with depths of 2 fathoms (3^m7) and less over it, and there are heavy rollers on it after strong breezes.

The Bar is situated between Tai-hsia-chin sha-tsui and Chih-wen tao.

Obstruction.—An obstruction, reported in 1936, is charted in a position about 1½ miles north-eastward of Ta chiao, near the outer end of Tai-hsia-chin sha-tsui.

Islands and dangers in the entrance.—Lu hsü or Te chou, 188 feet (57^m3) high, is the outermost of the islands in the entrance to Shan-t'ou chiang. A rocky patch lies about 2 cables eastward of the south-eastern point of the island; at the southern end of this patch is a rock one foot (0^m3) high, and at the northern end is a rock which dries 8 feet (2^m4).

Mu hsü or Ma-hsü-k'ou, 127 feet (38^m7) high, situated about half a mile north-westward of Lu hsü, appears double when seen from south-eastward; the southern hill is the higher and has a flagstaff and an old fort on it. A hill situated on a spur on the eastern side of the island appears square-topped when seen from south-eastward. The white walls of some houses on the island are noticeable from seaward. Kuai chiao (*Lat.* 23° 20' N., *Long.* 116° 45' E.), consisting of some rocks which dry 5 feet (1^m5), lies about one cable southward of the south-eastern point of Mu hsü; the channel between these rocks and Lu hsü should not be used.

Ma tao, 75 feet (22^m9) high, is an island lying about half a mile south-westward of Mu hsü and close off the southern shore of the channel; a small islet lies close off its north-western extremity.

Light.—A light is exhibited, at an elevation of 200 feet (61^m0), from a red circular tower, 21 feet (6^m4) in height, situated on the south-eastern end of the summit of Lu hsü; the keepers' dwellings are white. For leading lights on Lu hsü, *see* page 94.

Entrance channels.—**Dangers.**—Lu-hsü shui-tao (Te-chou channel) is the south-western of the two channels giving access to Shan-t'ou chiang; it lies between the south-western sides of Lu hsü and Mu hsü and the coast south-westward, and is about 1½ cables wide in the narrowest part, with depths of from 60 to 12 fathoms (11^m0 to 21^m9) in the fairway. The tidal streams, especially the flood stream, are strong, and cause eddies off the north-western extremity of Lu hsü, which may render navigation difficult when there is much shipping in the channel; Fu-yin chiao is a rock lying about 3 cables southward of Mu hsü, on the southern side of the fairway and has a depth of 3 fathoms (5^m5) over it. Kuai chiao, situated on the northern side of the fairway, has been already described.

Tung shui-tao (Eastern channel) lies north-eastward of Lu hsü and Mu hsü; it was not navigable in 1942.

Fishing stakes.—**Lights.**—Between Mu hsü and the anchorage off Shan-t'ou are numerous rows of fishing stakes, some of which are a hindrance to navigation at night. In daylight they form a very good guide for the main channel inside the harbour, as they are placed in

Chart 854.

deep water on either side. Buoys are frequently placed to mark the fishing nets off the south-western point of Mu hsü; a *white* light is usually exhibited from the outer stakes, but it cannot be relied on.

- 5 Vessels occasionally come into collision with the fishing stakes, when damages are usually successfully claimed by the fishermen; boats have been frequently swept by the tidal streams against the submerged nets, in several instances with loss of life. The nets are only laid out during the out-going stream.

- 10 **Lights.**—Lights are situated on the south-western side of Lu hsü. The front light is exhibited from a white pole with a triangular topmark; the rear light from a white pole with an inverted triangular topmark, situated about $1\frac{1}{4}$ cables south-eastward of the front mark. These lights, in line bearing 127° , indicate the south-western
15 extremity of the fishing stakes off Mu hsü. In 1948, these lights were described as experimental.

- Harbour.—Coast.—Dangers.—Buoyage.—Beacon.**—The southern shore of the harbour is backed by hills of Vincent range. Between a position abreast Ma tao and Chüeh-shih tsui, a point situated
20 about $2\frac{1}{4}$ miles westward, the coast is indented by Ni wan, a bay which dries, in which lies Hai-hsin shan, an islet 65 feet (19^m8) high. Another small islet, 15 feet (4^m6) high, lies about a quarter of a mile south-eastward of Chüeh-shih tsui, which is the north-eastern point of Chüeh shih, a promontory situated opposite the town of Shan-t'ou.
25 Chüeh shih appears from seaward as one continuous hill, as the numerous ravines on it are only seen when close to; Ching-chia shan (*Lat. $23^\circ 19' N.$, Long. $116^\circ 40' E.$*), situated about $1\frac{1}{4}$ miles south-westward of Chüeh-shih tsui, is 697 feet (212^m4) high and is prominent. The hills eastward of Ching-chia shan are irregular, rugged, and
30 strewn with boulders, but are cultivated in places. The former British Consulate is situated on the northern side of the promontory, and a stone jetty with a wooden extension, which renders it accessible to boats except at very low tides, extends from the shore here; there is a pier, suitable for use by boats at all states of the tide, about one
35 cable westward of the Consulate. Other Europeans' houses are also situated on the promontory. A 193-foot (58^m8) hill lies nearly 3 cables westward of the Consulate, and a 233-foot (71^m0) hill lies about 4 cables eastward of the same place; each has a prominent boulder on the summit; in 1936 these boulders had white rectangular marks
40 painted on them.

- Kung-hsieh shih, a rock 50 feet (91^m4) high, lies close off the northern extremity of Chüeh shih. Kung-hsieh chiao, a rock with a depth of 4 feet (1^m2) over it, lies about three-quarters of a cable north-north-westward of Kung-hsieh shih; a black conical buoy,
45 surmounted by a black inverted frustum cage, is moored off the north-eastern side of Kung-hsieh chiao. Ssu-an (Szu-an) chiao, a rock lying about 2 cables westward of Kung-hsieh shih, has a depth of 4 feet (1^m2) over it.

- Hu-kou chiao, a rock lying about half a mile westward of Kung-hsieh shih, is a pinnacle with a depth of 6 feet (1^m8) over it; a black conical buoy, surmounted by a black spherical cage, is moored off its
50 north-eastern side.

Niu-mu chiao is a rock lying about 2 cables northward of Niu-t'ien chou (chow), the north-western extremity of Chüeh shih, and is

Charts 1957, 1962, 1968, 2661b, 1262, 1263.



Two views of coast near Chia-tzu chiao.
(Originals dated 1935).



Nan-p'eng ch'ün-tao from eastward.
(Original dated 1935).

Chart 854.

covered at high water ; a black stone beacon, 5 feet (1^m5) in height, surmounted by a sphere, stands on this rock.

Ta-hao tsui is a point situated about half a mile west-south-westward of Niu-t'ien chou, and marks the western harbour limit. Chiao hsü, 42 feet (12^m8) high, and Tsao hsü, 120 feet (36^m6) high, are small islets lying about one mile westward of Ta-hao tsui, off the northern entrance to Ta-ta-pu creek (page 90).

On the northern shore, there is a large round Chinese fort situated nearly opposite Chüeh-shih tsui. Between this fort and the entrance to the harbour, the northern shore consists of a well cultivated plain, dotted with numerous villages, and is deeply indented by a drying bay. This bay is fronted by Nei sha, a bank with depths of 3 fathoms (5^m5), or less, over it, which extends into the channel and narrows the fairway to a width of about 3 cables between it and a similar bank extending from the southern shore. The town of Shan-t'ou, which is described on page 99, lies westward of the fort. A branch of Han chiang, a creek leading to Ch'ao-an, flows past the western end of the town ; a red conical buoy is moored off the western entrance point of this creek (*Lat. 23° 21' N., Long. 116° 40' E.*).

Tidal streams.—The tides are predicted in Admiralty Tide Tables, but are considerably influenced by the prevailing winds, thus : with easterly winds of more than force 3 high tide may be expected later and higher, and low tide sooner and higher than the predictions ; with westerly winds of more than force 3 high tide may be expected sooner and lower, and low tide later and lower than the predictions. It is stated that during the south-west monsoon the rise may be only 2 or 3 feet (0^m6 or 0^m9) for a number of days.

In Lu-hsü shui-tao, Tung shui-tao, and the channel between Lu hsü and Mu hsü, the in-going stream runs from one to 2 hours after low water until one to 2 hours after high water, and the out-going stream from one to 2 hours after high water until one to 2 hours after low water. Eddies from westward of Lu hsü, particularly with the in-going stream. The tidal streams set directly through Lu-hsü shui-tao, except north-westward of Lu hsü, where a branch of the out-going stream runs along the northern side of that island.

At the anchorage off Shan-t'ou the in-going stream runs from 1½ hours after low water until three-quarters of an hour after high water, and the out-going stream from three-quarters of an hour after high water until 1½ hours after low water. The stream on the southern side of the anchorage turns earlier than that on the northern side.

The in-going stream attains a maximum rate of 2 knots, and the out-going 4 knots.

Pilots.—Pilotage is not compulsory, but it is advisable. If a pilot is required, ships should include a request in their E.T.A. message. The pilot will meet incoming vessels about one mile eastward of Chih-wen tao in a white boat with a black band near the gunwhale ; the boat has the words " Licensed Pilot Boat " painted on the stern, and flies the International Code Flag " H ".

Anchorage.—**Mooring buoys.**—Vessels moor to buoys or anchor in the harbour by direction of the Harbour-master, who either boards vessels, or instructs the pilot in advance.

The quarantine anchorage is situated between the meridian through the round Chinese fort on the northern shore and the meridian

Chart 854.

through a point about half a cable westward of Chüeh-shih tsui.

There are two anchorages for oilers. The eastern anchorage lies between the western limit of the quarantine anchorage and the
 5 meridian through an old fort situated on the southern shore about half a mile west-north-westward of Chüeh-shih tsui. The western anchorage lies between the meridian through the beacon on Niu-mu chiao and the meridian through Ta-hao tsui.

The explosives anchorage lies eastward of the eastern limit of the
 10 quarantine anchorage.

There are several numbered mooring buoys off Shan-t'ou, the positions of which can best be seen from the chart.

In order that Customs formalities may be carried out in daylight, vessels may not enter Shan-t'ou chiang between the hours of 1700
 15 and 0700. During bad weather, however, vessels may enter the port at night for shelter, but must anchor well eastward of the meridian through the round Chinese fort.

In 1936, H.M.S. *Sandwich* moored with the former British Consulate flagstaff bearing 168° , distant $3\frac{1}{4}$ cables, and found good holding
 20 ground. In 1926, H.M.S. *Foxglove* found good holding ground about $4\frac{1}{4}$ cables north-eastward of Chiao hsü (*Lat.* $23^{\circ} 20' N.$, *Long.* $116^{\circ} 38' E.$).

Harbour regulations.—The following are extracts from the Harbour regulations for Shan-t'ou chiang (1948):—

25 1.—The term "vessel" in these regulations refers to vessels of foreign type.

5.—Vessels shall moor in accordance with instructions received from the Harbour-master, and shall not shift their berths without a special permit.

30 6.—Applications for berths or for permission to shift must be made at the Harbour-master's Office by the Agents, the Master, or the pilot in charge.

7.—Vessels arriving and having on board as cargo any high explosives or the specially prepared constituents of such, any loaded
 35 shells or more than 100 pounds of gunpowder, any quantity of small-arm safety cartridges in excess of 50,000 rounds, or any other fixed ammunition of which the aggregate quantity of powder charges exceeds 100 pounds, shall anchor in the explosives anchorage, shall fly a red flag at the fore during daylight, and, in regard to the dis-
 40 charge of the same, they shall abide by the instructions received from the Customs.

Vessels having to receive on board any such explosives shall observe similar precautions.

9.—Every craft of whatever description conveying explosives
 45 through any part of the waters of the port shall exhibit a red flag, not less than 6 feet by 4 feet (1^m8 by 1^m2), at the foremast head or where it can best be seen; and in the case of all boats or lighters thus employed which are not fitted with masts, the flag must be exhibited at a height of not less than 12 feet (3^m7) above the highest
 50 part of the deck or house.

11.—Vessels arriving with mineral oil, spirits of wine, turpentine, or arrack as cargo, which exceeds 3,000 cases, shall anchor in one of the anchorages for oilers. Vessels having less than 3,000 cases may

Charts 1962, 1968, 2661b, 1262, 1263.

Chart 854.

anchor in the ordinary anchorage, but may not go alongside a wharf if they have more than 500 cases.

Vessels discharging at licensed oil installations do not come under this rule. 5

Bulk-oil steamers are required to take all such precautions as are customary in their trade.

12.—Vessels arriving with naphtha, benzine, ether, or other high inflammables as cargo shall anchor in one of the anchorages for oilers. Such cargo must not be taken through nor landed in the ordinary anchorage area except at licensed oil installations. 10

15.—A vessel arriving with an infectious disease on board shall anchor in the quarantine anchorage, shall fly a yellow flag at the fore, and shall allow no one to disembark or come on board without permission from the Port Health Officer. 15

19.—Ballast, ashes, garbage, refuse, spoil obtained by dredging or otherwise, etc., must not be thrown into the harbour. Vessels wishing to discharge ashes or other refuse should hoist the International Code flag Y at the fore truck, when an ash-boat provided by the Company concerned will attend and take delivery. 20

21.—Vessels are required to conform to "Regulations for Preventing Collisions at Sea".

22.—Vessels, when in the harbour and its approaches, are forbidden to proceed at such a speed as renders their wash dangerous to other craft. 25

25.—No vessels, except men-of-war, may use swinging booms.

26.—No merchant vessel shall fire guns, cannons, or small arms within the harbour.

27.—All vessels shall keep on board a sufficient number of hands to clear and pay out chain. The hawse must always be kept clear. 30

28.—In case of fire occurring on board a vessel in port, the fire bell must be rung immediately by that vessel, and by those above and below her, and the signal NQ, International Code ("Fire, want immediate assistance"), hoisted by the burning vessel, if possible, and by those above and below her, during the day, or a light lowered and hoisted continually during the night. 35

Berthing signals.—Port signals.—The berths to be taken by vessels arriving are signalled from the Customs house flagstaff; a vessel's House flag or National flag over a black ball, with a numeral flag below, indicates the particular buoy to be taken. 40

The International Code-flag "B" indicates "anchor as convenient." Masters of vessels are, however, requested not to anchor eastward of the line joining Niu-mu-chiao beacon and the red conical buoy situated about half a mile northward, as this berth is used solely as a swinging berth. 45

The International code flag "Q" hoisted below a vessels' House flag or National flag indicates that the vessel is in quarantine and is to proceed direct to the quarantine anchorage and await medical inspection.

The following special signals, by flags of the International Code of Signals, were in use at Shan-t'ou chiang, in 1948, in addition to those given on page 32 :—

Charts 1962, 1968, 2661b, 1262, 1263.

Chart 854.

Signal	Meaning
Flag E	Emigrants ready for counting
Flag L	Customs Officer wanted
6 Flag N	Berthing Officer wanted
Flag O	Coolies wanted
Flag R (Half-mast)	Water boat wanted
Flag Y	Ash boat wanted

Wharves.—Piers.—There are no actual wharves in the port, only 10 pontoons with bridge connections to the shore; these pontoons, which are the property of the various shipping companies, had, in 1943, a total frontage of 900 feet (274^{m3}), with depths alongside of from 13 to 19½ feet (4^{m0} to 5^{m9}). It was reported, in 1948, that only one pontoon, with frontage of 180 feet (54^{m9}) and depth of 17 15 feet (5^{m2}) alongside, was available.

In 1943, two piers were maintained by oil companies for the use of their own tankers, with depths alongside of 18 and 34 feet (5^{m5} and 10^{m4}), respectively.

Directions.—Vessels should not attempt to enter Shan-t'ou chiang 20 during the out-going stream unless it is a flat calm or they are certain of having depths of from 5 to 6 feet (1^{m5} or 1^{m6}) under them, on account of the heavy sea then on The Bar. A good way to estimate the depth on The Bar is to sound 2 cables north-eastward of Chih-wen tao, and this sounding, reduced by 7 feet (2^{m1}), gives approxi- 25 mately the least depth on The Bar at the time. When approaching Shan-t'ou chiang from northward, vessels may pass either eastward or westward of Wu-chiao-erh (for clearing marks, *see* page 92), according to draught, and then proceed to a position about 4 cables north-eastward of Chih-wen tao. From southward, vessels must pass 30 eastward of the islets and dangers off-lying the coast between Hao-wang chiao and Chih-wen tao (*Lat.* 23° 17' N., *Long.* 116° 47' E.).

For Lu-hsü shui-tao, the following route was followed by the pilots in 1927 :—After passing Chih-wen tao a vessel should steer for Lu-hsü lighthouse, bearing 319°; when Hsin-chi shan is in line with 35 Chien shih, bearing 285°, she should alter course to 310°, through Lu-hsü shui-tao, taking care to keep Chien shih well open of the land north-westward of it in order to clear Fu-yin chiao; for leading lights for clearing the fishing stakes off Mu hsü, *see* page 94.

When outward bound, it is useful to know that when Kuai chiao 40 is covered a depth of not less than 19 feet (5^{m8}) will be found on The Bar.

Storm warnings.—Typhoon anchorages.—Typhoon and storm warnings are received from Hsü-chia-hui (Zikawei) Observatory, Shang-hai and the Royal Observatory, Hong Kong; all weather 45 telegrams received are displayed on the notice board outside the Harbour-master's office.

Storm signals are hoisted on the flagstaff near the Custom house (*see* page 99), when a typhoon is within 100 miles of Shan-t'ou. When a gale or typhoon is expected to strike the port, additional signals are 50 hoisted; the gale signal is one black ball by day, or one *red* light at night, and the typhoon signal is two black balls by day, or two *red* lights at night, disposed vertically.

On the approach of a typhoon, vessels usually leave the anchorage off Shan-t'ou and anchor about midway between the round Chinese

Chart 854.

fort on the northern shore and Mu hsü, where the holding ground is better and the typhoon can be ridden out in safety. Vessels of moderate draught can proceed up the river and anchor about 4 cables north-westward of Chiao hsü, where there will probably be less sea. 5

Town of Shan-t'ou.—Shan-t'ou (*Lat. 23° 21' N., Long. 116° 40' E.*), contains several handsome buildings, eastward of the town are many fine houses; the Custom house, with a flagstaff nearby, is situated on the waterfront near the western end of the town; the Anglo-Chinese college, about 1½ miles east-north-eastward of the Custom house, is a building with a tower. A prominent white water tower stands about 4 cables northward of the Custom house, and two radio masts, about 2½ cables north-eastward of the Custom house, are also prominent. 15

The population of Shan-t'ou in 1952 was about 200,000.

Harbour facilities.—**Supplies.**—**Communications.**—All loading and unloading must, according to port regulations, be done by lighters, of which large numbers are available.

A moderate supply of coal was reported to be available in 1943, but there were no stocks in December, 1948. Coal is supplied from lighters. 20

Fuel and Diesel oil are obtainable from pipe lines at the Oil companies' piers. It was reported, in 1948, that supplies were irregular and unreliable. 25

Fresh provisions are plentiful; water is supplied to vessels in the stream by water boat.

There are several hospitals at Shan-t'ou.

Only very minor emergency repairs to vessels can be executed.

Shan-t'ou was formerly connected to Ch'ao-an by rail, but the railway was reported to be destroyed, in 1948. There is frequent steamship communication with Hong Kong and the principal ports in China. In 1948, there were air services to Shang-hai, Hong Kong, and Canton. 30

Shan-t'ou is connected to the general telegraph system. There is telephone service within the town only. 35

Climatic Table.—See Chapter I, page 64.

Charts 1962, 1760.

COAST.—**Shan-t'ou chiang to Hsia-men chiang.**—**General remarks.**

—From Shan-t'ou chiang, the coast trends generally north-eastward for about 100 miles to Hsia-men chiang. Between the entrance to Shan-t'ou chiang and K'ao-k'ö chiao (page 114), a distance of about 78 miles, it is very irregular, and has a number of large indentations, of which the most important are Che-lin wan (Challum bay), Chao-an wan (Chauan bay), Tung-shan chiang (Tongsang harbour), and Fou-t'ou wan (Hutau bay). The large island of Nan-ao tao (Namao) lies off the coast about 12 miles east-north-eastward of the entrance to Shan-t'ou chiang, and islets and dangers extend about 12 miles south-eastward from it, the outermost, Nan-p'eng ch'ün-tao (Lamock islands), lying about 20 miles from the nearest part of the mainland. Islands and dangers extend some distance offshore in various places further north-eastward, the principal being Hsiung-ti tao (Brothers islets) situated about 12 50

Charts 1957, 1968, 2661b, 1262, 1263.

Charts 1962, 1760.

miles offshore about midway between Shan-t'ou chiang and Hsia-men chiang, and Tung-ting tao (Chapel island), situated about 8 miles offshore in the approach to Hsia-men chiang.

5 Chart 1957.

Coast.—Islands.—From Pagoda hill (page 92), the coast trends north-north-eastward for about 15 miles to the head of a shallow inlet which is bordered on its eastern side by islands extending southward from the mainland for about 8 miles, and forming the western side of Che-lin wan, which is described on page 105. The coast is low and intersected by numerous branches of the delta of Han chiang, which include Nan chiang and Pei chiang. Huang-men tao is the southernmost island, and Fou-wei shan, 430 feet (131^m1) high, lies near its south-eastern extremity. Huang-men tao is separated from Hai shan, northward, by Shih-kou men, at the western end of which is Chih hsü, 46 feet (14^m0) high, and numerous rocks. Hai shan is separated from the mainland northward by San-pai men.

Lai-wu tao, 289 feet (88^m1) high, lies about 1½ miles east-north-eastward of Pagoda hill (*Lat.* 23° 25' N., *Long.* 116° 49' E.), and is divided into two parts by a low neck; there is a fort on the south-western part of the island. Feng hsü, 295 feet (89^m9) high, lies about 3¼ miles north-eastward of Lai-wu tao, and there are shoal depths between it and the coast; Feng chiao is the south-eastern point of this island. Coffin islets, four in number, the highest 92 feet (28^m0) high, lie about 3 miles northward of Feng hsü, and 1½ miles west-south-westward of the western end of Huang-men tao. Triple islets lie in the centre of the inlet about 5 miles northward of Coffin islets. Breaker islet, 125 feet (38^m1) high, is a peaked rock lying about 4 miles north-eastward of Feng hsü and about one mile southward of the south-eastern point of Huang-meng tao; there are other rocks close westward and northward of it, and the group is named Wu hsü.

Nan-ao tao.—General remarks.—Caution.—Nan-ao tao lies with Ch'ang-shan wei, its south-western extremity, situated about 13½ miles north-eastward of Hao-wang chiao (page 91). Ch'ang shan, 1,929 feet (588^m0) high, lying about 1½ miles eastward of Ch'ang-shan wei, Kuo-lao shan or Nan-ao feng, 1,890 feet (576^m1) high, in about the middle of the eastern half of the island, Ta-chien shan, 1,722 feet (524^m9) high, about 1¾ miles north-westward of Kuo-lao shan, and Yen-lung shan, 974 feet (296^m9) high, near the south-eastern corner, are prominent features.

Although the island is barren, it is well populated, the fisheries affording a livelihood to the greater portion of the inhabitants. There are a number of villages on the island, of which the following are the most important:—Lung-ao, situated on its narrowest part, Yün-ao, in the south-eastern part, and Ch'ing-ao and Nan-ao or Shen-ao, the latter being walled, in the north-eastern part.

The channel leading northward of Nan-ao tao has been examined by sweeping. The width of the area examined varied from about 5 miles at the south-western end, about 5 miles south-westward of Ch'ang-shan wei, to about 3 miles wide at the eastern end, northward of Pei chiao (page 102), and narrowed to about one mile in the middle. The depth of the sweep was varied in accordance with the general

Charts 1968, 2661b, 1262, 1263.

Chart 1957.

depth in each vicinity, and was sufficient to establish the non existence of any dangers other than those charted.

Large fishing stakes exist off the coasts of Nan-ao tao, and line the channel inside the island.

Southern coast of Nan-ao tao.—Islet and off-lying dangers.—Anchorages.—Three Chimney bluff (*Lat. 23° 24' N., Long. 117° 07' E.*), the south-eastern point of Nan-ao tao is a bold headland rising to an elevation of 387 feet (118^m0). Hsieh tao, 98 feet (29^m8) high, with a flat top, lies off the entrance to Yen-tun wan, a shoal bay situated between Three Chimney bluff and Nan chiao or South point, lying about 1½ miles westward.

Yün-ao wan lies between Nan chiao and a point lying about 2½ miles westward, and affords good shelter in the north-east monsoon. Tan-shui yen, with a depth of 3 fathoms (5^m5) over it, lies about 2½ miles south-westward of Nan chiao; fishing stakes may be found extending from the shore of Yün-ao wan to this rock. Three Chimney bluff bearing 065°, and open south-eastward of Hsieh tao, leads south-eastward of Tan-shui yen. K'ai-pien yen, with a depth of 2 fathoms (3^m7) over it, lies about 2½ miles west-south-westward of Nan chiao.

Nearly 4 miles westward of Nan chiao is a point with a pagoda on it, and close westward of the latter point is a small bay named Yün-kai-ssu ao.

The anchorages off the villages of Yün-ao and Lung-ao are called, respectively, Yün-ao po-ti and Lung-ao po-ti.

A series of shifting sand knolls, with depths of from 7 feet to 3 fathoms (2^m1 to 5^m5) over them, and on which the sea usually breaks, lie within a distance of 5 miles south-westward of Ch'ang-shan wei; their positions can best be seen from the chart.

Tidal streams.—Off the southern coast of Nan-ao tao the east-north-east-going tidal stream attains a rate of about 2 knots off Three Chimney bluff, when it changes its direction to north-eastward; there are usually heavy tide-rips, especially during the north-east monsoon, southward of the bluff, where the depths are very uneven.

Ch'ang-shan po-ti.—Danger.—Caution.—Ch'ang-shan po-ti lies off the north-western coast of Nan-ao tao between Ch'ang-shan wei and Opium point, situated about 3 miles north-eastward, and affords anchorage in the south-west monsoon in depths of from 5 to 6 fathoms (9^m1 to 11^m0), good holding ground.

Folkestone rock, with a depth of 5 feet (1^m5) over it, lies about 1½ miles west-north-westward of Opium point; the northern end of Lai-wu tao (page 100), bearing about 247° and open south-eastward of the southern point of Feng hsü (page 100), leads south-eastward of this rock.

During the north-east monsoon, a vessel can anchor off a small bay, situated close northward of Ch'ang-shan wei, in depths of from 5 to 6 fathoms (9^m1 to 11^m0).

Vessels approaching from north-eastward must exercise caution, as large fishing stakes may be found in the channel northward of Nan-ao tao.

Northern coast of Nan-ao tao.—Islets.—Anchorage.—Ch'ien-shui wan or Lung-men ao, with general depths of less than 2 fathoms (3^m7), lies between Opium point and a point situated about 4½ miles

Chart 1957.

eastward. An hsü, 285 feet (86^m9) high, lies nearly 1½ miles eastward of Opium point; Batao rock, 62 feet (18^m9) high, lies close northward of An hsü; westward and southward of the latter are
 5 some rocks above water. Lung-ao village is situated on the low land at the head of the bay, where the island is only about half a mile across.

Ao k'ou lies between the eastern entrance point to Ch'ien-shui wan and Pei chiao, situated about 3½ miles eastward; at its head is the
 10 walled village of Nan-ao. Hu-tzu hsü or Pagoda islet, 89 feet (27^m1) high, and Lieh hsü or Battery island, 341 feet (103^m9) high, lie on the eastern side of the bay. Ao k'ou is shoal, and vessels not exceeding 18 feet (5^m5) draught cannot anchor further southward than Hu-tzu
 15 hsü bearing 079°; during the north-east monsoon there is a considerable swell, and the entrance to Che-lin wan (page 105) is then a better anchorage.

Pei chiao, the northern extremity of Nan-ao tao, rises to a double peak 587 feet (178^m9) high; rocks extend 3 cables north-eastward from the point.

20 The area between the eastern end of Nan-ao tao and the mainland northward is called Shen-ao po-ti.

Tidal streams.—The tidal streams northward of Nan-ao tao run parallel to the coast; the east-going stream runs from 3 to 5 hours after high water at Shan-t'ou until three to one hour before the
 25 next high water, and the west-going stream from 3 to one hour before until 3 to 5 hours after high water at Shan-t'ou. The rate is from one to 3 knots, but is less off Ao k'ou.

Eastern coast of Nan-ao tao.—Islet and dangers.—Outlying dangers.—Some rocks above water and rock which dry lie close off
 30 the coast for about one mile southward of Pei chiao (*Lat.* 23° 29' N., *Long.* 117° 07' E.).

The bay situated between Pei chiao and Shih shih, a point lying about 1½ miles south-south-eastward, is called Chu-hsi ao.

Tung chiao or East point, situated about 2½ miles south-south-
 35 eastward of Pei chiao, is bare and clifty, and rises to a summit 230 feet (70^m1) high; Hart rock, with a depth of 25 feet (7^m6) over it, lies 6 cables eastward of this point. Ta-chien tao, 217 feet (66^m1) high, lies close off the coast about 1½ miles southward of Tung chiao. Glengyle rock, with a depth of 10 feet (3^m0) over it, lies
 40 about three-quarters of a mile southward of Ta-chien tao and 4 cables offshore; the sea breaks on it at low water; Wu hsü, bearing 208°, seen mid-way between Pai-ching and Ch'ih hsü, leads eastward of Glengyle rock; *see* page 104.

Gibson rock lies about 8½ miles eastward of Tung chiao, and has
 45 a depth of 19 feet (5^m8) over it. A 6-fathom (11^m0) and a 21-foot (6^m4) patch lie 2½ miles east-south-eastward and 4½ miles eastward, respectively, of Tung chiao.

Ch'i-hsing chiao, situated about 5 miles north-eastward of Tung chiao, consist of six rocks from 5 to 8 feet (1^m5 to 2^m4) high; when
 50 seen from eastward or westward these rocks appear as large boulders some distance apart.

Liu-niu chiao, situated about 5 miles north-eastward of Pei chiao, dries about 7 feet (2^m1); Ta-chien shan in line with the southern extremity of Hu-tzu hsü, bearing 240°, leads north-westward of

Charts 1962, 1968, 2661b, 1262, 1263.

Chart 1957.

Liu-niu chiao. Vessels using the channel northward of Nan-ao tao usually pass northward of this reef.

Nan-p'eng ch'ün-tao.—Anchorage.—Nan-p'eng ch'ün-tao is the outermost group of the islands and dangers lying south-eastward of Nan-ao tao ; it consists of four islets and a number of rocks above water and sunken rocks. 5

Nan-ta chiao, situated at the south-western end of the group, and about $12\frac{1}{2}$ miles south-eastward of Three Chimney bluff, consists of two square rocks about 15 feet (4^m6) high, with other rocks near them ; the western side of Tung-p'eng tao in line with the eastern side of Nan-p'eng tao (*see* below), bearing 032° , leads about three-quarters of a mile south-eastward of Nan-ta chiao. Pai shih, situated about one mile north-eastward of Nan-ta chiao, is surrounded by rocks, and is sufficiently large to afford shelter to a boat. All these rocks are covered by the sector of *red* light shown from the lighthouse on the south-western end of Nan-p'eng tao. 10 15

Nan-p'eng tao, situated nearly 3 miles north-eastward of Pai shih, is partly covered with grass and other vegetation ; the channel between this islet and Pai shih is clear. *See* view facing page 95. 20

Tung-p'eng tao lies about one mile north-eastward of Nan-p'eng tao, and rocks extend for about three-quarters of a mile from its south-western side. Pei shih lies close north-eastward of Tung-p'eng tao ; the northern rock is bare and has a pyramid on it.

Times rock (*Lat.* $23^\circ 18' N.$, *Long.* $117^\circ 20' E.$), situated nearly 2 miles north-eastward of Tung-p'eng tao, is a pinnacle with a depth of 9 feet (2^m7) over it. Nan-p'eng tao open north-westward of Tung-p'eng tao leads westward of Times rock, and open south-eastward leads south-eastward of the rock. 25

There is reported to be good anchorage, in depths of less than 10 fathoms (18^m3), in a position about half a mile westward of Nan-p'eng tao. 30

Tidal streams.—During the south-west monsoon the tidal streams in the vicinity of Nan-p'eng ch'ün-tao run north-eastward for about $8\frac{1}{2}$ hours, attaining a maximum rate of $1\frac{1}{2}$ to $2\frac{1}{2}$ knots, and south-south-westward for about 4 hours, with a maximum rate of one knot. At the anchorage westward of Nan-p'eng tao, a rate of 3 knots has been reported. 35

Lights.—Fog signals.—A light is exhibited, at an elevation of 242 feet (73^m8), from a black circular tower, 58 feet (17^m7) in height, situated on the summit of Nan-p'eng tao. The keepers' dwellings and boundary wall are white. A fog signal is sounded from this lighthouse. 40

A light is exhibited, at an elevation of 55 feet (16^m8), from a window in a white building nearly 2 cables south-westward of the main light-house. A fog signal is occasionally sounded. 45

Islands and dangers between Nan-p'eng ch'ün-tao and Nan-ao tao.—The depths between Nan-p'eng ch'ün-tao and Nan-ao tao are very uneven ; the shoal patches are frequently marked by ripples. 50

In 1906, a 6-fathom (11^m0) patch was reported about $3\frac{1}{4}$ miles westward of Pai shih ; in 1907, a 7-fathom (12^m8) patch was reported about $2\frac{1}{4}$ miles west-north-westward of Nan-p'eng tao, and a 9-fathom (16^m5) patch about $1\frac{1}{4}$ miles north-westward of Tung-p'eng tao.

Sinta rock, a pinnacle with a depth of 2 feet (0^m6) over it, lies

Chart 1957.

about 5 miles north-westward of Pai shih ; it is marked by tide-rips. A 6-fathom (11^m0) patch lies about three-quarters of a mile south-eastward of Sinta rock, and about half a mile further south-eastward is a 5-fathom (9^m1) patch. Another 6-fathom (11^m0) patch lies about three-quarters of a mile eastward of Sinta rock. A shoal, with a least depth of 34 feet (10^m4) over it, lies nearly 3 miles eastward of Sinta rock.

Yüan shih or Yeng rock, awash, lies nearly 5 miles northward of Sinta rock. Pei chiao, bearing about 325° and open north-eastward of Tung chiao, leads about three-quarters of a mile north-eastward of this rock. Depths of 8½ and 7 fathoms (15^m5 and 12^m8) are situated, respectively, about half a mile and 1½ miles northward of Yüan shih.

Lei-men chu-tao, lying north-westward of the Nan-p'eng ch'ün-tao and southward of the eastern end of Nan-ao tao consists of four islets and a number of rocks above water and sunken rocks.

Ch'ih hsü, 79 feet (24^m1) high, the south-eastern islet of the group lies about 8½ miles north-westward of Pai shih ; a rock, 6 feet (1^m8) high, lies close off its north-eastern side. A 19-foot (5^m8) patch lies 2 cables north-north-westward, and a 5-fathom (9^m1) patch 7 cables north-north-eastward of Ch'ih hsü. Dot rocks lie about 4 cable, southward of Ch'ih hsü and dry 7 feet (2^m1). Sul rocks, situated about 4 cables southward of Dot rocks, dry from 4 to 7 feet (1^m2 to 2^m1), with a rock, one foot (0^m3) high, in the northern part. Norway rock, lying about 1½ miles south-south-eastward of Ch'ih hsü, is a pinnacle with a depth of 11 feet (3^m4) over it ; in calm weather, during the strength of the tidal stream, it is marked by ripples.

Pai-ching or Pai-an hsü, 89 feet (27^m1) high, situated about 1½ miles westward of Ch'ih hsü, lies on a shoal with depths of less than 5 fathoms (9^m1) over it. Detached patches, with depths of 25 and 32 feet (7^m6 and 9^m8) over them, lie, respectively, about a quarter of a mile north-north-westward and the same distance north-north-eastward of Pai-ching (*Lat.* 23° 19' N., *Long.* 117° 06' E.).

Ping hsü, 43 feet (13^m1) high, situated about one mile north-westward of Pai-ching, has a flat top ; a drying rock and a 2-foot (0^m6) rock lie off its south-eastern point, and a 33-foot (10^m1) patch lies a quarter of a mile north-north-westward of its northern end ; a shoal, with depths of less than 6 fathoms (11^m0) over it, extends about 1½ miles west-south-westward from Ping hsü. Mackinnon rock, situated about 7 cables north-eastward of Ping hsü, is a pinnacle with a depth of 5 feet (1^m5) over it ; a 34-foot (10^m4) patch lies nearly 1½ miles north-westward of Ping hsü.

Wu hsü or Dome islet, 128 feet (39^m0) high, lies about 3 miles north-eastward of Ping hsü, and is the northernmost of the group. A rock, with a depth of 16 feet (4^m9) over it, lies about 3 cables westward of Wu hsü, and a shoal, with a least depth of 4 fathoms (7^m3) over it, lies about 4 cables south-eastward of the islet.

A shoal, with a depth of 27 feet (8^m2) over it, lies about 1½ miles west-north-westward of Wu hsü.

Pan-ch'ao chiao or Half-tide reef, situated nearly one mile northward of Wu hsü, dries 5 feet (1^m5) ; a 4-fathom (7^m3) patch lies about a quarter of a mile eastward of the reef. A channel about one mile wide between Pan-ch'ao chiao and the coast of Nan-ao tao north-westward has been swept to a depth of 33 feet (10^m1).

Charts 1962, 1968, 2661b, 1262, 1263.

Chart 3715, plan of Challum Bay anchorage.

Che-lin wan.—Islands and dangers.—Che-lin wan (Challum bay) is entered between Pei shan (Ford point), situated at the north-eastern end of Huang-men tao (Prong island) and Chi-t'ou shan or Ch'en-ch'i to'u (Fort head), lying about $3\frac{1}{2}$ miles eastward. The entrance to the bay is known as Ta-chin men. 5

The western side of Che-lin wan is formed by Huang-men tao and other islands between it and the coast northward. The town of Che-lin is situated on the eastern side of the bay.

A bank, with depths of less than 3 fathoms (5^m5) over it, extends as much as $2\frac{1}{2}$ miles eastward from Huang-men tao. Ching hsi (Middle islet), a barren rock on the eastern edge of this bank, lies about $2\frac{1}{2}$ miles east-south-eastward of Pei shan; it is 138 feet (42^m1) high. Rocks, 6 and 8 feet (1^m8 and 2^m4) high, lie, respectively, about 6 cables east-south-eastward and 8 cables south-eastward of Pei shan; a rock, which dries 7 feet (2^m1), lies about 3 cables north-north-westward of the 6-foot (1^m8) rock. 15

Hsin-chou shan (Entrance island), 478 feet (145^m7) high, separated from the north-eastern extremity of Huang-men tao by Hsiao-chin men, a narrow channel, with a rock, which dries 3 feet (0^m9), in the middle, is mostly rocky and barren; Shang-hsiang is a village on its south-western side. The south-eastern extremity of the island is Camp point; the north-eastern extremity is Wybron point; and the western extremity is Flat point (*Lat.* $23^\circ 35' N.$, *Long.* $117^\circ 01' E.$). 20

Chi-t'ou shan is the southern extremity of a high peninsula connected to the coast by a low, sandy isthmus; on the inner end of this isthmus is Fort hill, a prominent hill, 536 feet (163^m4) high, at the southern end of Philips range, which runs along the eastern side of the bay. A large patch of sand on the north-western slope of the peninsula is conspicuous from south-westward. East shoal, situated 6 cables westward of Chi-t'ou shan, has a depth of 2 fathoms (3^m7) over it. Sand point is the western extremity of the peninsula. 30

Che-lin tao (Challum island) is separated from the peninsula just described by Junk passage, a narrow channel which almost dries at its northern end; two rocks, which dry 2 feet (0^m6) and 6 feet (1^m8), respectively, lie in the northern entrance of this passage. The island has several rocky summits, the highest, 324 feet (98^m8) high, being at the north-western end; there are numerous patches of cultivation, and, in addition to a few scattered houses, there is a village in the south-eastern part of the island. Several small islets lie off the eastern- and north-eastern sides of Che-lin tao, and pagodas stand on two of them. 40

Wicks hill, 486 feet (148^m1) high, lies on the eastern shore of the harbour nearly 2 miles northward of Che-lin tao.

Back Bay island, 187 feet (57^m0) high, situated nearly 2 miles northward of Hsin-chou shan, is well cultivated, and there is a large village, named Pai-chou, on its northern side. White rock, 45 feet (13^m7) high, lies on the mud flat extending from the southern side of the island. 45

Anchorage.—**Directions.**—The greater part of Che-lin wan is shoal, but good anchorage can be obtained, in depths of from 5 to 6 fathoms (9^m1 to 11^m0), mud, between Hsin-chou shan and Che-lin tao, though it is somewhat obstructed by fishing stakes; this anchorage is sheltered from winds from between north-east and south-east, and 50

Charts 1957, 1962, 1968, 2661b, 1262, 1263.

Chart 3715, plan of Challum Bay anchorage.

there is a least depth of $3\frac{3}{4}$ fathoms (6^m9) in the fairway of the approach.

Good anchorage has been reported in a position about half a mile south-eastward of Ching hsü.

Che-lin wan should be approached with the north-eastern extremity of Hsin-chou shan bearing 326° , which leads about $1\frac{1}{2}$ cables eastward of Ching hsü and between the banks extending from either side of the entrance; when about a mile within Ching hsü, course should be altered to about 340° , and a vessel can anchor in mid-channel, with Newrick point (*Lat. $23^\circ 35' N.$, Long. $117^\circ 03' E.$*), the north-western extremity of Che-lin tao, bearing about 064° .

On a clear night, the previously mentioned sand patch on the peninsula on the eastern side of the entrance is a good mark when approaching from south-westward.

Tidal streams.—At the anchorage the in-going stream sets north-north-westward, and continues until about an hour after high water at Shan-t'ou; the out-going stream sets southward, and continues until about an hour after low water at Shan-t'ou. The maximum rate of both streams is about $2\frac{1}{2}$ knots at spring tides.

Chart 3715, plan of Challum Bay anchorage, chart 1957.

Coast.—Islets and dangers.—Between Chi-t'ou shan and Difficult point, situated about $2\frac{1}{2}$ miles north-eastward, the coast recedes and forms a bay.

25 Chart 3715, plan of Challum Bay anchorage.

A group of rocks, some of which are 10 feet (3^m0) high and others of which dry, lies close off the coast nearly half a mile eastward of Chi-t'ou shan, and about $1\frac{1}{2}$ miles north-eastward of this head is an isolated rock, 9 feet (2^m7) high, situated near the edge of the coastal bank.

Chart 1957.

A small islet, named Hu hsü, lies close off Difficult point; Difficult islet, 121 feet (36^m9) high, lies close offshore about half a mile north-eastward of the point.

Between Difficult point and the entrance to Niu-mu-chiao ao, situated about $6\frac{3}{4}$ miles east-north-eastward, the coast recedes and forms Ta-ch'eng wan. Ternate rock, awash, lies about $1\frac{3}{4}$ miles eastward of Difficult point and one mile offshore.

Niu-mu-chiao ao is an extensive but very shallow inlet, with a narrow entrance. The eastern side of the entrance is formed by a rocky peninsula, attaining an elevation of 374 feet (114^m0) on its south-eastern side; its north-eastern side is low and cultivated. Barren head is the south-eastern point of this peninsula. A prominent pagoda, with the top 302 feet (92^m0) high, stands on a hill about $2\frac{1}{2}$ miles northward of Barren head, on the south-eastern side of Niu-mu-chiao ao.

Chart 3715, plan of Chauan bay.

Chao-an wan.—Islands and dangers.—Chao-an wan (Chauan bay) is entered between Barren head (*Lat. $23^\circ 36' N.$, Long. $117^\circ 15' E.$*) and Chao-an t'ou (Chauan head), situated about $4\frac{1}{2}$ miles east-south-eastward. The eastern side of the bay is formed by the large island of Su-chien shan or T'ung-shan tao and the northern part of the bay is known as Chao-an nei-ao (Chauan basin).

The bay affords good shelter during the south-west monsoon, but

Charts 1962, 1760, 1968, 2661b, 1262, 1263.

Chart 3175, plan of Chauan bay.

in the north-east monsoon a short, steep sea arises in the bay when the wind is strong, and renders the anchorage uncomfortable; the bottom is soft mud and bad holding ground. On the approach of a typhoon a vessel at anchor in the bay should proceed to Ch'ang-shan 5 po-ti (page 101) or Tung-shan chiang (page 109).

Shoal water, marked by discoloration, extends about one mile from the western side of the entrance, and a detached shoal, with a least depth of $2\frac{1}{2}$ fathoms (4^m6) over it, lies about $1\frac{1}{2}$ miles south-south-eastward of Barren head, thus forming a bar across the entrance 10 channel to the bay; with a moderate swell the sea breaks on this bar from about 2 hours before to 2 hours after low water. Some drying rocks lie close off Brown point, situated about $2\frac{1}{2}$ miles north-eastward of Barren head, and marked by a hill 152 feet (46^m3) high; drying patches extend nearly one mile offshore in places between 15 Barren head and Brown point.

Nei hsü (Kwadra island), 302 feet (92^m0) high, lies about $2\frac{1}{2}$ miles eastward of Barren head and in the middle of the entrance to the bay, near the western edge of shoal ground extending westward from Chao-an t'ou; the entrance channel is along its western side. Some 20 drying rocks lie within a quarter of a mile westward of the island, and within about 3 cables south-westward of its southern extremity. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about three-quarters of a mile southward from the island, and just within its outer edge is a patch with a depth of 4 feet (1^m2) over it. 25

Mitre rock, 44 feet (13^m4) high, lies nearly 4 cables eastward of Nei hsü and midway between this island and Pai hsü.

Pai hsü (High island) has several summits, the highest, 394 feet (120^m1) high, being at the south-western end; Pu-tai ao is a bay in the middle of its northern side. 30

On the western side of the bay between Brown point and Double point, situated about $2\frac{1}{2}$ miles northward, there is a shallow bay with numerous drying rocks, some lying nearly $1\frac{1}{2}$ miles offshore.

From Chao-an t'ou, the eastern shore trends north-eastward for about 3 miles to Dollar point, and thence a further 2 miles to Black 35 mound, which is 60 feet (18^m3) high. Between Black mound and Sell point, situated about 3 miles north-westward, there is an extensive shallow bay.

Tan shan, 447 feet (136^m2) high, lies about $1\frac{1}{2}$ miles east-north-eastward of Chao-an t'ou (*Lat.* $23^\circ 34' N.$, *Long.* $117^\circ 19' E.$). 40

Anchorage.—Directions.—There is anchorage, in a depth of 6 fathoms (11^m0), with the northern point of Nei hsü bearing 103° distant about half a mile; vessels can also anchor further inside the bay, in a depth of $2\frac{1}{2}$ fathoms (5^m0), with the western side of Chao-an t'ou in line with the south-western extremity of Pai hsü, 45 bearing about 168° .

A vessel entering the bay, from a position about 2 miles south-westward of Nei hsü, should bring the 152-foot (46^m3) high summit on Brown point in line with a dip in the hills behind, bearing 019° ; this mark leads across the bar in a depth of about $2\frac{1}{2}$ fathoms (5^m0). 50 When the southern extremities of Pai hsü and Nei hsü are in line, bearing 070° , she should steer 038° for the anchorage. Fishing stakes are frequently to be found between Nei hsü and Brown point.

Tidal streams.—The tidal streams turn about a quarter of an hour

Chart 3715, plan of Chauan bay.

before high and low water at Shan-t'ou, and attain a maximum rate of $1\frac{1}{2}$ knots at spring tides; there is a considerable diurnal inequality. North-westward of Nei hsü the streams set north-
5 westward and south-eastward.

Coast.—Islets and dangers.—Off-lying bank.—Anchorage.—Hou wan (Owick bay) lies between P'ing-t'ou (Ping tau) a rocky point situated about one mile east-north-eastward of Chao-an t'ou, and A-wei-k'o chiao (Owick point), the extremity of a peninsula situated
10 about $1\frac{1}{2}$ miles east-south-eastward; Owick hill, 104 feet (31^m7) high, rises just within A-wei-k'o chiao. A rock, 9 feet (2^m7) high, lies $1\frac{1}{2}$ cables southward of A-wei-k'o chiao, and a rock below water lies close off the western side of this rock. Anchorage can be obtained, in a depth of $3\frac{1}{2}$ fathoms (6^m4), mud, with the 9-foot (2^m7)
15 high rock bearing 135° ; this anchorage is sheltered from northerly winds, but should not be used during the typhoon months, as it is unsafe with south-westerly winds. Hou wan should not be approached within a depth of less than 5 fathoms (9^m1) after dark, as the distance from the land is very deceptive; there is a conspicuous
20 sand patch on the side of the hills about $1\frac{1}{2}$ miles north-eastward of A-wei-k'o chiao. Fishing stakes may be found from 2 to 5 miles southward of Hou wan.

Hu hsü (Bell islet) lies nearly $2\frac{1}{4}$ miles eastward of A-wei-k'o chiao, and is 260 feet (79^m2) high and perforated on its north-western and
25 south-eastern sides; Pao hsü (Little Bell islet), 181 feet (55^m2) high, lies about 2 cables northward of Hu hsü (*Lat. $23^\circ 34' N.$, Long. $117^\circ 25' E.$*). A reef, with depths of less than 3 fathoms (5^m5) over its outer edge, extends about 7 cables north-westward from Hu hsü; the channel between this reef and the coast northward should be used
30 with caution, as the tidal streams are strong.

There is fairly good anchorage, sheltered from easterly and northerly winds, but open to the swell, about half a mile westward of Hu hsü, in depths of from 7 to 9 fathoms (12^m8 to 16^m5), mud; in May, 1935, it was reported that this anchorage was entirely occu-
35 pied by fishing stakes. Ta-mao shan (Jokako peak), situated about $2\frac{1}{4}$ miles north-westward of the point, is a conical hill, 816 feet (248^m7) high, with a conspicuous sand patch on its southern slope.
Chart 1957.

Chou-k'o-k'o chiao, situated about 4 miles eastward of A-wei-k'o chiao, rises to an isolated hill 640 feet (195^m1) high; there is a large
40 village at the foot of the western slope of this hill.

Shih hsü, 166 feet (50^m6) high, lies about three-quarters of a mile south-eastward of Chou-k'o-k'o chiao, with a clear channel between; a reef, drying 9 feet (2^m7), lies about one cable northward of the
45 north-western point of the islet, and there are some patches, with depths of 5 and 6 fathoms (9^m1 and 11^m0) over them, around the islet. Hsiang hsü, 316 feet (96^m3) high, lies about $1\frac{1}{4}$ miles north-eastward of Shih hsü, and is perforated at its north-western end. Miranda bank lies nearly 2 miles south-eastward of Shih hsü and has a least
50 depth of 8 fathoms (14^m6) over it; the depths in this locality are very irregular.

Chou-k'o-k'o chiang or Jokako bay lies between Chou-k'o-k'o chiao and Cone point, situated about 5 miles north-eastward, and is separated from the north-eastern part of Chao-an wan by a low,

Charts 1962, 1760, 1968, 2661b, 1262, 1263.

Chart 1957.

sandy isthmus about one mile wide in its narrowest part. Cone point rises a short distance within to Cone peak, 890 feet (271^m3) high. A peaked rock, 30 feet (9^m1) high, with a rock a quarter of a mile north-eastward of it, lies off Cone point. Chimneys hill lies about 1½ miles north-westward of Cone peak.

Charts 1958, 1957.

Between Cone point and a point situated about 3½ miles north-north-eastward, the coast recedes and forms a bay, near the centre of which rocks, above water, extend about three-quarters of a mile offshore. An islet and some rocks are situated close off the northern entrance point of this bay.

Tidal streams.—The tidal streams off Chou-k'o-k'o chiao are strong, and set north-eastward and south-westward; there are tide rips in the vicinity of Shih hsü and Hsiang hsü. In the offing the tidal streams set north-eastward from about 5 hours after high water to one hour before the next high water at Shan-t'ou, and south-south-westward from one hour before until 5 hours after high water at Shan-t'ou, both streams attaining a rate of from one to 2 knots.

Chart 1957.

Outlying islets.—Hsiung-ti tao consists of two islets situated about 12 miles south-eastward of Cone point. Hsiao-kan shan, the north-western islet, has a remarkable square summit. Ta-kan shan, the south-eastern islet, has a bluff at its southern end, and a reef extends about a quarter of a mile westward. It has been reported that there is a channel 1½ miles wide and clear of dangers, between the two islets.

In 1926, fishing stakes were reported about 5 miles northward of Hsiung-ti tao (*Lat.* 23° 33' N., *Long.* 117° 40' E.).

See view below.



Ta-kan shan bearing
176°, 10½ miles

Hsiung-ti tao
(Original dated 1935).

Chart 1958.

Tung-shan chiang.—Islands and dangers.—Tung-shan chiang is one of the best harbours on this part of the coast, and affords shelter during a typhoon. It is entered between a point situated about 3½ miles north-north-eastward of Cone point and Ku-lei t'ou, nearly 3¼ miles eastward. Ku-lei t'ou is the southern extremity of a peninsula about 9 miles long, forming the eastern side of the harbour; it is steep to except on its eastern side, where some rocks lie about a cable offshore. The southern part of this peninsula is high, but it is connected to the mainland northward by a low narrow neck about 3 miles in length. Fu-erh feng (Fall peak), situated about 3½ miles northward of Ku-lei t'ou, is 930 feet (283^m5) high and very sharp, and is separated from a 792-foot (241^m4) high hill close south-eastward by a deep indentation.

Yunnan rock, situated nearly 2½ miles south-westward of Ku-lei t'ou, is a pinnacle with a depth of 2 fathoms (3^m7) over it.

A mud bank, with a least depth of 3½ fathoms (6^m9) over it, lies about midway between Yunnan rock and Ku-lei t'ou (*Lat.* 23° 43' N., *Long.* 117° 35' E.).

Charts 1962, 1760, 1968, 2661b, 1262, 1263.

Chart 1958.

Tung-shan, a walled town, is situated on a peninsula on the western side of the entrance, about $1\frac{1}{2}$ miles north-north-eastward of the western entrance point. Fu-ting hsü, divided into two parts by a sand spit about 20 feet (6^m1) high, is separated from the above peninsula by a deep channel about 3 cables wide; a pagoda, with the top elevated 294 feet (89^m6), stands on the western end of the southern part of the island. Rocks and shoal water extend 3 cables from the eastern end of the northern part of Fu-ting hsü. There are strong tide rips in the passage between Tung-shan and Fu-ting hsü, and it is not even used by junks.

Mid islands, three in number, are situated on the south-eastern end of a shallow mudbank, about three-quarters of a mile north-eastward of Fu-ting hsü; rocks extend $1\frac{1}{2}$ cables southward of the southern point of the southernmost island, and a cairn stands on the eastern summit of the middle island.

Tzu-mei lieh-tao is a group of islets situated about $1\frac{1}{2}$ miles north-north-eastward of the northernmost Mid island.

There are a number of other islets just inside the harbour north-westward of Fu-ting hsü; among them are T'a hsü and Lien hsü, situated, respectively, about $1\frac{1}{2}$ miles northward and $2\frac{1}{2}$ miles north-north-westward of Tung-shan.

The eastern shore of the harbour is steep-to for a mile northward of Ku-lei t'ou, thence it is fronted by a broad bank with depths of less than 3 fathoms (5^m5). There is deep water between this bank and Mid islands, and also between Fu-ting hsü and Mid islands.

Northward of Mid islands the harbour widens out to an extensive, though shoal basin, called T'ung-shan nei-ao, which has been only partially examined; a boat channel leads from its western side to Chao-an wan. Ts'ung-ti lieh-tao consists of a group of islets situated near the centre of the basin and about 9 miles north-north-westward of Ku-lei t'ou. At the northern end of the basin is Greene range, which has a rugged appearance and terminates north-eastward in Thumb peak (chart 1760). Chang chiang flows into the head of T'ung-shan nei-ao.

Anchorages.—Directions.—Tung-shan chiang is one of the best harbours on this part of the coast, and affords anchorage during a typhoon. Good anchorage may be obtained with Fu-erh feng bearing 060° , and the highest part of Tzu-mei lieh-tao bearing 358° ; in this position H.M.S. *Britomart* rode out a typhoon, in 1913, which passed between Tung-shan chiang and Hsia-men. In 1945, H.M.S. *Wager* found anchorage in a depth of about 14 fathoms (25^m6), with Fu-erh feng bearing 046° and the northern extremity of the northern Mid island bearing 313° . Both the above positions fall within an area which was found by H.M.S. *Bluebell*, in 1924, to be fouled by fishing stakes, usually not visible above water.

There is also anchorage in the channel between Fu-ting hsü and Mid islands, but the latter islands must be given a berth of 2 cables, as a mud bank extends from them; the best berth is in a depth of 12 fathoms (21^m9), with Tzu-mei lieh-tao showing through the opening between the two northern Mid islands. In 1935 H.M.S. *Sandwich* anchored in this channel with the pagoda on Fu-ting hsü (Lat. $23^\circ 44' N.$, Long. $117^\circ 33' E.$) bearing 235° , distant $9\frac{1}{2}$ cables; the depth in this position was 16 fathoms (29^m3), being considerably more than the chart shows. The tidal streams are strong.

Charts 1760, 1968, 2661b, 1262, 1263.

Chart 1958.

Tzu-mei lieh-tao, bearing less than 005° and well open eastward of Mid islands, leads eastward of the mud bank off the entrance to Tung-shan chiang. In clear weather, Thumb peak (chart 1760) in line with the highest part of Tzu-mei lieh-tao, bearing 358°, is a good mark for entering the harbour.

Coast.—Islands and dangers.—Anchorage.—From Ku-lei t'ou, the coast trends north-north-eastward for about 5½ miles to Rees point. Depths of 5 fathoms (9^m1) are charted up to about one mile offshore about 1½ miles north-north-eastward of Ku-lei t'ou.

Chart 1958, plan of Rees pass.

Rees rock, situated about 4 miles north-eastward of Ku-lei t'ou and one mile offshore, dries 12 feet (3^m7); East rock, lying about one cable eastward of it, is awash. Pass islets, situated about 1½ miles northward of Rees rock, are two peaked islets close together and about 90 feet (27^m4) high, with a rock above water close off the northern islet; there is shoal water and foul ground between them and Rees rock, including Pass bank. Junks use a channel about 2 cables wide, with a least depth of 6 fathoms (11^m0), between Pass islets and the mainland, but great caution is necessary in steering owing to the strong eddies. About half a mile northward of Pass islets there is a small peninsula, the extremity of which is Rees point; it consists of a rocky eminence, about 70 feet (21^m3) high, connected to the coast by a sandy isthmus.

Rees pass, bounded westward by Pass islets and the peninsula just described, and eastward by Li-shih lieh-tao, described below, is about three-quarters of a mile wide between the shoals on either side and has depths of over 10 fathoms (18^m3) in the fairway. A shoal, with a least depth of 2½ fathoms (4^m1) over it, lies on the eastern side of the pass and about 3 cables westward of Feng-sui tao, the north-western island of Li-shih lieh-tao. Anchorage can be obtained, in a depth of 6 fathoms (11^m0), about three-quarters of a mile westward of the southern point of Feng-sui tao and about 2 cables north-westward of a black, rocky islet.

Chart 1958.

Off-lying islands and dangers.—Li-shih lieh-tao is a group of islands comprising Feng-sui tao, 227 feet (69^m2) high; Heng hsü, Ts'ai hsü, 300 feet (91^m4) high; and Nan-tung tao, with a number of small islets and rocks; they are all barren and are only visited by fishermen. P'o-ch'uan chiao, situated about 6 cables north-eastward of Nan-tung tao, consists of several islets and rocks; a rock below water lies about one cable north-eastward of the eastern rock. Caution must be exercised in the vicinity of Li-shih lieh-tao; the few soundings shown on the chart indicate a very uneven bottom, and this is confirmed by the manner in which the sea rises quickly and overtops immediately a breeze sets in.

Tung-ch'iang (Lat. 23° 49' N., Long. 117° 45' E.), an island situated about 2 miles north-eastward of P'o-ch'uan chiao, rises in three peaks, each about 156 feet (47^m5) high, the top of the island appearing long and flat. There is shoal water off the north-western side of the island; landing can be effected on the south-eastern side, but it is difficult.

Pa-liu, an islet, 40 feet (12^m2) high, lies about 1½ miles west-north-westward of Tung-ch'iang, and a reef lies close off the eastern

Charts 1760, 1968, 2661b, 1262, 1263.

Chart 1958.

point of the islet. A rock, 30 feet (9^m1) high, with a reef off its western side, lies about 4 cables south-eastward of Pa-liu.

- Gu rock, which dries 3 feet (0^m9), lies about 2 miles west-north-westward of Pa-liu. In 1935, the *Shuki Maru* struck a submerged obstruction, probably a rock, in a position about one mile east-south-eastward of Gu rock.

Flying Fish rock, which dries 3 feet (0^m9), lies about 9 cables north-eastward of Gu rock.

- 10 Ching rock, situated about 1½ miles northward of Pa-liu, is the highest part of a reef and dries 6 feet (1^m8); the eastern part of the reef only breaks at low water. The easternmost rock of P'o-ch'uan chiao open eastward of Pa-liu, bearing 178°, leads about 3 cables eastward of the reef.

- 15 **Tidal streams.**—In October, near Feng-sui tao, the tidal streams in this area set between south and south-west, with a maximum rate of 1½ knots on the falling tide, and between north-east and north-west, with a maximum rate of one knot on the rising tide.

- In a position about 1½ miles south-eastward of Nan-tung tao the 20 tidal streams set between south and south-west on the rising tide, and between north-north-west and north-west on the falling tide; the maximum rate of both streams is 1½ knots.

Charts 811, plan of anchorages between Hei tou and Pan chiao; 1958.

- Fou-t'ou wan and Fou-t'ou chiang.**—Fou-t'ou wan lies between 25 Rees point and Hei t'ou, situated about 8½ miles north-eastward. Hei t'ou is formed by the southern and most remarkable of five hills situated on the southern half of a narrow peninsula extending about 6 miles south-south-westward from the mainland; these hills are smooth and round, with sandy valleys between, and on Town hill, 30 situated about 1½ miles northward of Hei t'ou, there is a walled town and several trees.

Chart 1958.

Awuta rock lies about 3 cables offshore on the western side of the bay about 1½ miles northward of Rees point.

- 35 Fou-t'ou chiang is an extensive basin, largely occupied by shallow flats, situated immediately westward of the peninsula terminating in Hei t'ou; it forms the estuary of Hutau-shan river (chart 1760), which discharges into its north-western corner. There is deep water inside its entrance, but it is not navigable unless previously buoyed, 40 as the shifting channels are narrow and intricate. A partly drying spit extends about 3½ miles south-westward from the western side of the peninsula.

- Anchorage.**—A vessel could possibly ride out a strong northerly wind in a depth of 4 fathoms (7^m3) in a position about 3 cables 45 southward of Hei t'ou (*Lat.* 23° 54' N., *Long.* 117° 45' E.). If the wind should increase to a gale, however, or should shift to eastward, this position should be left at once and refuge sought off Feng-sui tao (page 111), or in Tung-shan chiang (page 110).

Chart 811, plan of anchorages between Hei tou and Pan chiao.

- 50 **Coast.—Off-lying islets and dangers.—Anchorages.**—Ta-yü chiao (Tagau point) is situated about 1½ miles east-north-eastward of Hei t'ou, and Hut rocks, consisting of rocky ledges partly above water, extend about 6 cables eastward; Ts'ao-hsieh (Hut islet) is an islet lying about one cable within the eastern end of these rocks. Tagau

Charts 1760, 1968, 2661b, 1262, 1263.

Chart 811, plan of anchorages between Hei tou and Pan chiao.

rock, with a depth of 3 feet (0^m9) over it and foul ground northward, lies about 3 cables south-south-westward of Ts'ao-hsieh. Although a considerable swell runs round Ts'ao-hsieh, fairly good shelter with winds from northward of east-north-east may be obtained southward of Ta-yü chiao, in depths of from 4 to 6 fathoms (7^m3 to 11^m0), sand, with a fort situated about 4 cables west-north-westward of Ta-yü chiao bearing 348°, distant 4 cables, or, in a depth of about 6 fathoms (11^m0), with the fort bearing 029°, distant 8 cables.

The coast between Ta-yü chiao and P'an chiao, situated about 3 miles north-north-eastward, consists of low sandhills; Two Boulder point, lying nearly one mile northward of Ta-yü chiao, has red sandhills and cliffs 30 feet (9^m1) high. P'an chiao is the extremity of a prominent headland having several peaks, the highest being 236 feet (71^m9) high; there is a large boulder on the western part of the headland. Two rocks, which dry, lie close off the southern side of the headland, and 6 cables west-south-westward of P'an chiao is a rock which dries 13 feet (4^m0), with other rocks around. Two rocks, 9 and 10 feet (2^m7 and 3^m0) high, respectively, lie on the beach about 1½ miles northward of P'an chiao. A remarkable peaked sandhill rises close to the coast about 2½ miles northward of P'an chiao, the coast between being low and sandy; Black point, dark, table-topped, and rugged, lies about 8 cables eastward of the sandhill. Shun rock, with a depth of less than 6 feet (1^m8) over it, lies about 6 cables eastward of Black point.

Chieh yen, situated about 4½ miles eastward of Ts'ao-hsieh is 60 feet (18^m3) high and has a boulder on its summit; see view below.



Land near Chiang-chun ao (Red bay.)

(Original dated 1865.)

Chieh yen from S.S.Wd.

Baker rock, situated about one mile north-eastward of Ts'ao-hsieh, has a depth of 3 feet (0^m9) over it, and lies on the southern side of a shoal with depths of less than 5 fathoms (9^m1) over it.

A shoal, with depths of from 3½ to 5 fathoms (5^m9 to 9^m1) over it, extends nearly one mile northward from a position about 6 cables westward of Baker rock; a 4½-fathom (8^m7) patch lies between the northern end of this shoal and Pai-ya (see below). Anchorage may be found inside this shoal, in a depth of about 7 fathoms (12^m8), in a position about one mile north-north-eastward of Ts'ao-hsieh.

Pai-ya (Spire islet) (Lat. 23° 56' N., Long. 117° 48' E.), an islet situated about one mile north-north-eastward of Baker rock, is the south-eastern of a group of rocky islets, from 35 to 69 feet (10^m7 to 21^m0) high, lying on a sunken plateau with depths of less than 5 fathoms (9^m1) over it; a detached shoal, with a least depth of 4½ fathoms (7^m8) over it, lies off the western side of this plateau. A square pillar of rock marks Pai-ya which is the highest of the group; see view on chart 811.

Charts 1958, 1760, 1968, 2661b, 1262, 1263.

Chart 811, plan of anchorages between Hei tou and Pan chiao.

Cleft islet, 54 feet (16^m5) high, lies about one mile northward of Pai-ya, and Outer Cleft islet, 6 feet (1^m0) high, is about 4 cables eastward of the former; these two islets are known as Wai-pi 5 lieh-tao. A rock, above water, lies about one cable northward of Cleft islet, with foul ground between, and about 2 cables further northward are Cleft rocks; the southern of these rocks has a depth of one foot (0^m3) over it, and the northern is awash. Thomson rock, with a least depth of 3 fathoms (5^m5) over it, lies about three-quarters 10 of a mile north-eastward of Cleft islet; a 5-fathom (9^m1) patch lies about 6 cables eastward of this rock. Pass rock, with a depth of one fathom (1^m8) over it, lies about one mile northward of Cleft islet.

Blakeney pass.—Directions.—Blakeney pass is the inshore passage between the coast between Ta-yü chiao and Black point, and the 15 off-lying islets and dangers; it is useful for steam vessels of low power proceeding against the north-east monsoon.

From southward or westward, a vessel should pass half a mile southward of Ts'ao-hsieh so as to clear Tagau rock; when the peaked sandhill near Black point comes in line with P'an chiao, 20 bearing 014°, she should keep this mark on until Chieh yen is in line with Pai-ya, bearing about 119°, when course should be altered to pass between P'an chiao and Cleft islet. Town hill in line with P'an chiao, bearing 237° astern, leads between Cleft rocks and Pass rock, and north-westward of Thomson rock; care must be taken, 25 however, that the vessel is on this leading mark before Cleft islet bears more than 160°.

The track just described leads over the extensive shoal, with a least depth of 3½ fathoms (5^m9) over it, lying between Ts'ao-hsieh and Pai-ya. To obtain a depth of not less than 6 fathoms (11^m0), 30 Ts'ao-hsieh should be rounded at a distance of about a quarter of a mile, and then kept astern bearing 190°; when Pai-ya bears 090° a north-easterly course may be steered to pass between P'an chiao and Cleft islet, thence following the track described above.

Chart 1760, plan of Red bay.

35 **Chiang-chun ao.—Dangers.—Anchorage.**—Chiang-chun ao (Red bay) lies between Black point and the southern extremity of a headland situated nearly 2 miles north-eastward; K'ao-k'o chiao (Cork point), situated about one mile further north-eastward, is the north-eastern extremity of this headland, and a reef extends about 4 cables 40 eastward from it. The land behind the bay consists of low red sandhills.

Shun rock, lying about 6 cables eastward of Black point (*Lat.* 24° 00', *N.*, *Long.* 117° 49' *E.*), has been described on page 113; the north-eastern entrance point of the bay in line with the southern 45 rock of Chiang-chun chiao (*see below*), bearing about 056°, leads close south-eastward of this danger.

Chiang-chun chiao (Black rocks), lying about half a mile south-westward of the north-eastern entrance point of the bay, is a group of rocks 55 feet (16^m8) high; a reef, which dries, extends about 2½ 50 cables north-westward from these rocks, leaving a boat passage between it and the mainland. A reef, which dries, lies about 6 cables north-westward of Chiang-chun chiao. There is a creek, with a village on the western side of the entrance, on the northern side of the bay; the entrance to this creek dries.

Charts 1958, 1760, 1968, 2661b, 1262, 1263.

Chart 1760, plan of Red bay.

Chiang-chun ao affords fairly good anchorage, in any convenient position, for small vessels during the north-east monsoon; the northern part of the bay is, however, shoal.

Chart 1760.

5

Coast.—Islets and dangers.—Tsao shan (Mount Edmond), situated about 6 miles north-westward of K'ao-k'o chiao, is a good landmark. House hill, situated on the coast about $8\frac{1}{2}$ miles north-eastward of K'ao-k'o chiao, is low and has the ruins of a house on its summit. House Hill point is the southern extremity of an islet connected with House hill at low water; a reef, with three drying patches of rock on it, extends three-quarters of a mile south-south-westward from this rock. A group of rocks, just above water, lies nearly 4 miles south-westward of House hill and half a mile offshore. A shoal inlet, known as Chung-chou by the natives, runs some distance inland along the western side of House hill; there is a sandbank, which dries in places, across the entrance. Two peaked sandhills, 300 to 400 feet (91^m4 to 121^m9) high, lie fully one mile northward of House Hill point.

Lin-yu hsü or Notch islet, situated about $2\frac{3}{4}$ miles north-eastward of House Hill point and close offshore, is of basaltic formation; its summit is 300 feet (91^m4) high, and somewhat steep and square. Reefs extend a quarter of a mile southward and half a mile north-westward from the islet, and there are depths of 5 fathoms (9^m1) and less for fully three-quarters of a mile eastward. Temporary shelter can be obtained under the lee of this islet during the north-east monsoon

25

Pei-mi-lo-fu or North Merope, lying about 3 miles eastward of Lin-yu hsü, is a reef of pinnacle rocks, the highest of which dries 8 feet (2^m4).

Chapman patch, situated about 2 miles north-eastward of Lin-yu hsü and one mile offshore, is a rocky patch with a depth of 2 fathoms (3^m7) over it, except at the eastern end, where there is a pinnacle rock with a depth of only 5 feet (1^m5) over it.

Out-lying islands and dangers.—Nan-ting hsü (Lamtia islet), 170 feet (51^m8) high, situated about $3\frac{1}{4}$ miles south-eastward of House Hill point, is of basaltic formation and rises steeply on its southern side; a reef extends about half a mile north-westward from this islet.

35

Nan-mi-lo-fu or South Merope, a shoal with a least depth of 5 feet (1^m5) over it, lies with its south-western end about 3 miles south-eastward of Nan-ting hsü, and there are depths of less than 5 fathoms (9^m1) for about 5 miles north-eastward of this position.

40

Tung-ting tao (Chapel island) (*Lat. $24^{\circ} 10' N.$, Long. $118^{\circ} 14' E.$*), situated nearly 11 miles east-north-eastward of Nan-ting hsü, is of basaltic formation, 180 feet (54^m9) high, with steep sides and a grassy top, and is perforated at its southern end; there is also a remarkable mound at either end; see view below.

45



*Tung-ting tao (Chapel island)
(Original dated 1943.)*

Charts 1968, 2412, 1262, 1263.

Chart 1760.

Rambler shoal, situated about 3 miles north-westward of Tung-ting tao, is a small patch with a depth of $4\frac{1}{2}$ fathoms (8^m2) over it.

Erl King shoal lying about 5 miles north-westward of Tung-ting tao has a least depth of $2\frac{3}{4}$ fathoms (5^m0) over it.

So far as is known there are no other shoals off this part of the coast except those already described; the depths, however, are very irregular in this neighbourhood, and there are several patches with depths of from 5 to 6 fathoms (9^m1 to 11^m0) over them. Vessels of deep draught should, therefore, always pass outside Tung-ting tao (*Lat. $24^{\circ} 10' N.$, Long. $118^{\circ} 14' E.$*).

Light.—Fog signal.—A light is exhibited, at an elevation of 227 feet (69^m2), from a black circular tower, 63 feet (19^m2) in height, situated on the summit of Tung-ting tao. The keepers' dwellings and boundary wall are white.

A fog signal is occasionally sounded from the lighthouse.

Tidal streams.—At Tung-ting tao, in the south-west monsoon, the tidal stream has been observed to set northward during the rising tide at Hsia-men, with a maximum rate of $1\frac{1}{2}$ knots, and south-westward during the falling tide there, with a maximum rate of about 2 knots at spring tides.

About 5 miles westward of Tung-ting tao, in the north-east monsoon, the tidal stream is rotatory and sets west-south-westward at the commencement of the falling tide at Hsia-men, then south-westward, and the last 3 hours south-eastward; during the rising tide the tidal stream sets northward.

Chart 1760, plan of Tingtai bay.

Coast.—Ting-t'ai wan.—Fu-pu-erh t'ou or Table head, situated about 8 miles north-eastward of House Hill point, is a prominent headland with a flat top; the ruins of a walled town are situated on a hill about $1\frac{1}{4}$ miles northward of the head.

Ting-t'ai wan (Tingtai bay), situated on the western side of the headland, affords fair shelter for small vessels during the north-east monsoon. A rocky patch, with a least depth of 2 fathoms (3^m7) over it, lies in the south-western part of the bay and nearly 2 miles west-south-westward of Fu-pu-erh t'ou.

Discoloured and broken water was reported, in 1927, to extend for a considerable distance from the coast between Fu-pu-erh t'ou and Chen-hai chiao (chart 1767), situated nearly 3 miles north-eastward.

*Chart 1767.***HSIA-MEN CHIANG AND APPROACHES.—General remarks.**

Hsia-men chiang, also known as Amoy harbour, consisting of an Outer and Inner harbour, is available for vessels of any draught at all times. The Inner harbour is known as Hsia-men nei-chiang.

The harbour is situated southward and south-westward of Hsia-men tao, a large island on which is the town of Hsia-men, and which lies about 10 miles northward of Chen-hai chiao (*Lat. $24^{\circ} 16' N.$, Long. $118^{\circ} 08' E.$*). The approach to the Outer harbour is bounded south-westward by the coast between Chen-hai chiao and Pagoda point, situated about $5\frac{1}{2}$ miles north-westward, with the off-lying islands and dangers; the northern side of the approach is formed

Charts 1968, 2412, 1262, 1263.

Chart 1767.

by Chin-men tao and Lieh hsü, two islands with various shoals and spits extending from their southern sides.

Pilotage.—Pilotage is compulsory. Pilot board incoming vessels in the Outer harbour, when they display the customary signal. 5

Outlying dangers.—Tidal streams.—Channel shoals are two ridges of sand and shells about half a mile apart. The south-eastern ridge, with a least depth of $3\frac{1}{2}$ fathoms (6^m9) over it, lies about 4 miles eastward of Chen-hai chiao; the north-western ridge has a least depth of $4\frac{1}{2}$ fathoms (8^m7) over it. 10

The tidal streams near Channel shoals are rotatory, backing from north-east to west through north on the rising tide at Hsia-men, and from west to north-east through south and east on the falling tide there. The maximum rates are $1\frac{1}{2}$ knots north and south-south-east, 3 hours before and after high water at Hsia-men, 15 respectively.

Westacott shoals, situated about 7 miles west-north-westward of Chen-hai chiao, are a group of shoals with a least depth of $4\frac{1}{2}$ fathoms (8^m7) over them.

South-western side of the approach.—Islands and dangers.—The 20 coast between Chen-hai chiao and Pagoda point consists of a number of rocky points with sandy bays between. Nantai pagoda, 60 feet (18^m3) in height, stands on the summit of a mountain, 1,852 feet (564^m5) high, situated nearly $2\frac{1}{2}$ miles south-westward of Pagoda point and is conspicuous. 25

Depths of less than 5 fathoms (9^m1) extend about half a mile offshore south-eastward of Chen-hai chiao.

Banterer reef consists of a number of drying rocks lying on a spit, with depths of less than 5-fathoms (9^m1) over it, extending fully three-quarters of a mile north-eastward of Chen-hai chiao; the reef must 30 be given a wide berth, as there is a depth of 4 fathoms (7^m3) about a quarter of a mile south-eastward of its outer extremity. The summit of San-t'an islet, situated about $6\frac{1}{2}$ miles northward of Chen-hai chiao, in line with the eastern side of Wu hsü (*see below*), bearing 353° , leads fully 3 cables eastward of this danger. 35

A group of shoals, with depths of less than 10 fathoms (18^m3) over them, and a least depth of 8 fathoms (14^m6), lie about $1\frac{1}{2}$ miles east-north-eastward of Banterer reef.

Dome rock lies about 2 miles northward of Chen-hai chiao and $6\frac{1}{2}$ cables offshore; this rock dries 10 feet (3^m0) and there is foul ground 40 around. A reef, which dries from one to 6 feet (0^m3 to 1^m8) near its outer end, extends about 6 cables from the coast south-westward of Dome rock. A shoal spit extends about 2 cables offshore from the point lying westward of Dome rock.

Wu hsü lies with its southern end about one mile northward of 45 Dome rock, and is divided into two hilly parts, each about 200 feet (61^m0) high, by a low neck of sand, on the eastern side of which is a shallow bay with a sandy beach; there are sandy beaches along the western side of the island, and on the largest of these is a fishing village. A shoal, with a least depth of $4\frac{1}{2}$ fathoms (8^m7) over it, 50 extends about 3 cables southward from Wu hsü (*Lat.* $24^\circ 20' N.$, *Long.* $118^\circ 09' E.$). An obstruction was reported, in 1946, to be situated about 6 cables east-south-eastward of the northern extremity of Wu hsü and about $1\frac{1}{2}$ cables offshore.

Charts 1760, 1968, 2412, 1262, 1263.

Chart 1767.

Wu-an hsü, 192 feet (58^m5) high, lies midway between Wu hsü and the mainland westward, where the village of Tau-bi is situated. The channels on either side of Wu-an hsü are not recommended, 5 as the strong tidal streams render navigation difficult, and they are encumbered with islets, rocks, and reefs. Ku-ta rock, 10 feet (3^m0) high, lies about half a mile north-westward of Wu-an hsü, near the south-eastern end of a shoal bank which has a reef which dries 2 feet (0^m6) near its north-western end.

- 10 Ta chiao is the south-eastern and higher of two conspicuous rocks, above water, lying close together about 6 cables eastward of the eastern point of Wu hsü, and is 9 feet (2^m7) high. These rocks are covered by the red sector of Ch'ing-hsü light (page 121) between the bearings of 302° and 000°; the channel between them and Wu hsü 15 is deep and clear.

A group of shoals, with depths of less than 10 fathoms (18^m3) over them, and a least depth of 8 fathoms (14^m6), lie about half a mile south-south-eastward of Ta chiao (*Lat. 24° 20' N., Long. 118° 10' E.*).

- Ch'ing chiao consists of an islet, 62 feet (18^m9) high, with a few 20 shrubs on it, lying about half a mile north-westward of the northern point of Wu hsü, and several drying rocks off its western side, all lying on a shoal bank.

Peak hill, 426 feet (129^m8) high, situated close northward of Pagoda point, is conspicuous.

- 25 *Charts 1767, 1760.*

Northern side of the approach.—Chin-men tao.—Dangers.—

Anchorage.—Tidal streams.—Chin-men tao lies in the northern side of the approach to Hsia-men chiang; its northern coast forms the southern side of Wei-t'ou ao (Hu-i-tau bay) described on page 135

- 30 Pei-ting t'ou, the eastern extremity of the island, and Pei-ting tao, with its light, are described on page 134.

Chart 1767.

- Liao-lo wei, the south-eastern point of Chin-men tao, is a peaked islet, connected to the main island by a reef. Ta-wu shan is situated 35 about 3½ miles northward of Liao-lo wei; it is 779 feet (237^m4) high, and is the highest point on the island. Southward of Liao-lo wei the tidal stream sets westward during the rising tide, and eastward during the falling tide.

- Liao-lo wan lies between Liao-lo wei and Niao tsui-wei, a point 40 situated about 5½ miles westward. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about one mile from the eastern shore of the bay. The western part of the bay is foul; the outermost dangers are a 3¼-fathom (5^m9) patch lying fully 1½ miles eastward of Niao tsui-wei, and a 2½-fathom (4^m6) patch lying nearly 1½ miles 45 east-north-eastward of the same point. Ta-yen hsü, a prominent rock, 49 feet (14^m9) high, lies nearly half a mile eastward of Niao tsui-wei, and another rock, 16 feet (4^m9) high, lies about 3 cables east-south-eastward of the same point; there are other rocks, above and below water, around. Anchorage, sheltered from winds from 50 between north-west and north-east, can be obtained, in a depth of 4¾ fathoms (8^m7), mud and sand, with Liao-lo wei bearing 095° and Ta-wu shan bearing 015°; small vessels can anchor closer in, in a depth of 3¾ fathoms (6^m9). When the north-east monsoon is at its strength, however, this anchorage is unsuitable, as a heavy swell then sets in.

Charts 1968, 2412, 1262, 1263.

Chart 1767.

Chin-men-t'a, a conspicuous pagoda, 39 feet (11^m9) in height, stands on the summit of a hill, 176 feet (53^m6) high, situated on the south-western coast of Chin-men tao and about 6 cables south-eastward of Chin-kuei wei, the western extremity of the island, which lies about 3 miles west-north-westward of Niao tsui-wei (*Lat.* 24° 23' N., *Long.* 118° 20' E.).

Dangers southward of the western point of Chin-men tao.—Chin-men tui, the southern part of which is named Chin-men tui-tsui, is a bank which extends fully 3 miles southward from Chin-kuei wei and dries in places. Although a swell breaks on this bank, when the water is smooth it is not always marked at or near high tide; the western edge is steep-to.

Spit bank, with depths of less than 5 fathoms (9^m1) over it, continues about 1½ miles south-westward from the extremity of Chin-men tui-tsui; the least depth on the bank is 3½ fathoms (6^m9).

Swept area.—A considerable area on the southern side of Chin-men tao between Liao-lo wei and Chin-kuei wei has been examined by sweeping. The inner limit of the swept area varies from a half to 1½ miles offshore in Liao-lo wan, and from a quarter to half a mile offshore between Niao tsui-wei and Chin-kuei wei. The outer limit runs generally west-south-westward from a position about one mile southward of Liao-lo wei to a position about 2½ miles southward of Niao tsui-wei, and thence generally westward to near the southern extremity of Chin-men tui-tsui.

Lieh hsü.—**Buoy.**—Lieh hsü lies with Yen-tun shan, its south-eastern point, about one mile north-westward of Chin-kuei wei. The north-eastern part of the island is hilly, attaining an elevation of 328 feet (100^m0) at Ch'i-li shan; the south-western end consists of lower sandhills and cultivated ground.

Hou-chai hsü, 46 feet (14^m0) high, lies about 1½ cables south-eastward of the southern point of Lieh hsü, but is not noticeable against the land behind. A flat, with general depths of less than 3 fathoms (5^m5), extends off the whole of the southern side of Lieh hsü, up to a distance of about 1½ miles southward of Hou-chai hsü.

Some drying rocks extend up to about 6 cables west-north-westward of Feng tsui, the south-western point of Lieh hsü. A conical buoy, No. 6, painted in black and red horizontal bands, is moored about 4 cables west-north-westward of Feng hsü.

Chin-men Chiang.—**Dangers.**—**Buoys.**—**Jetty.**—Chin-men Chiang lies between Chin-men tao and Lieh hsü, and has general depths of from 6 to 11 fathoms (11^m0 to 20^m1) in the fairway, which leads through the harbour to the north-eastern side of Hsia-men tao (page 116). The harbour is encumbered by numerous shoals, many of which are in or near the fairway, and, as these are not marked, it should not be used without local knowledge.

The harbour is entered from southward by Chin-men shui-tao, a deep passage, about half a mile wide, between the western side of Chin-men tui, and the eastern side of the flat extending southward from Lieh hsü.

A black conical buoy, No. 1, is moored on the western side of the entrance channel about 1½ miles west-south-westward of Chin-kuei wei (*Lat.* 24° 25' N., *Long.* 118° 17' E.).

The eastern side of the harbour on which the town of Chin-men is

Chart 1767.

situated, is occupied by a partly drying flat, with drying boulders on it, extending about half a mile from the western coast of Chin-men tao. A rock, 23 feet (7^m0) high, lies on the flat about 1½ miles north-eastward of Chin-kuei wei.

A shoal area, in which are several rocks, including Middle ground, extends nearly one mile off the north-eastern side of Lieh hsü; the northern end of its eastern edge is marked by a black conical buoy, No. 2.

Chin-men chiang affords shelter from all winds, and is available in a typhoon.

A stone jetty extends from the eastern shore of the harbour, but its head dries.

Directions.—From eastward, after passing between Spit bank and Westacott shoals, a vessel should continue westward until a conspicuous summit lying south-westward of West peak (page 135) is seen between the north-eastern point of Lieh hsü and a small islet, 8 feet (2^m4) high, lying close off this point, bearing 005°; see view on chart 1767. Keep this mark on until Chin-men-t'a bears 100°, when a north-easterly course may be steered into the harbour.

Unless of light draught, vessels should not proceed further north-eastward than Ch'i-li shan, the summit of Lieh hsü, bearing 297°, as many shoal patches lie north-eastward of this line of bearing. The harbour is sheltered from northward, but with southerly winds a swell sets in and renders the anchorage uncomfortable.

Swept channel.—The channel leading through Chin-men chiang to the north-eastern side of Hsia-men tao has been examined by sweeping. The swept area extends from a position close westward of the southern extremity of Chin-men tui-tsui, through Chin-men chiang, and thence north-westward for a distance of about 8 miles. Generally speaking, the width of the swept channel varies from about half a mile to one mile except for a short stretch about 3 miles northward of Lieh hsü, where it narrows to about 3 cables.

Channels between Lieh hsü and Hsia-men tao.—**Buoys.**—**Swept channels.**—The area between Lieh hsü and Hsia-men tao is encumbered with shoals, on which many small islets and reefs are situated, through which two deep channels lead to the north-eastern side of Hsia-men tao. The channels are entered on either side of Hu-tzu hsü, 116 feet (35^m4) high, which lies about 1½ miles west-south-westward of Feng tsui (Lat. 24° 25' N., Long. 118° 13' E.). The eastern channel is called Hsia-chin-men shui-tao, and the western Hsia-men-tao-tung-t'se shui-tao. The two channels unite about 5 miles north-north-eastward of Hu-tzu hsü, and join the channel leading through Chin-men chiang (page 119) about 3 miles further northward. These channels, which are marked by buoys in places, have been examined by sweeping.

Islands and dangers in the entrance.—Ch'ing hsü, situated nearly 1½ miles east-north-eastward of Pagoda point and on the south-western side of the main entrance channel to the Outer harbour, is 168 feet (51^m2) high and flat topped, but has a slight indentation in the middle. The south-eastern side of the island is steep-to, but a spit extends about one cable from its north-western side. A rock, almost awash, lies about 3 cables south-westward of Ch'ing hsü, and close north-eastward of this rock is a rock with a depth of 1½ fathoms (2^m3) over it, whilst a third rock, with a depth of 2½ fathoms

Charts 1760, 1968, 2412, 1262, 1263.

Chart 1767.

(5^m0) over it, lies a short distance northward. The out-going tidal stream sets strongly on to the island.

Jih hsü, situated about three-quarters of a mile north-eastward of Ch'ing hsü, Tao-sao hsü, and San-t'an are three islets lying together on a rocky bank on the north-eastern side of the main entrance to the Outer harbour; their heights are 55 feet (16^m8), 65 feet (19^m8), and 111 feet (33^m8), respectively. Shoal water extends about one cable south-westward from Jih hsü, and a 4 $\frac{1}{2}$ -fathom (8^m7) patch lies about a quarter of a mile southward of this islet; a 1 $\frac{1}{2}$ -fathom (3^m2) patch lies about 2 cables east-south-eastward of Jih hsü. Foul ground, including a rock which dries 12 feet (3^m7), extends for nearly half a mile north-westward of Tao-sao hsü.

Erh-t'an, an island 145 feet (44^m2) high, lies about half a mile eastward of San-t'an and has the remains of some ancient forts on it; a small islet lies on a spit extending about 2 cables from its eastern point, and some rocks lie close off the north-western side of the island. A 3-fathom (5^m5) patch lies about 3 $\frac{1}{2}$ cables south-eastward of the southern point of the island, and depths of less than 5 fathoms (9^m1) extend for a further half mile in this direction.

Ta-t'an is an island lying about 4 cables north-eastward of Erh-t'an, and both are just within the extremity of a shoal flat extending about 3 miles south-eastward from the south-eastern side of Hsia-men tao. Ta-t'an is divided into two parts by a low neck; the southern side of the south-eastern part is 280 feet (85^m3) high and bold; on the north-western part there is a temple. A rock, with a depth of less than 6 feet (1^m8) over it, lies on the northern end of a shoal about a quarter of a mile eastward of the eastern end of the island; an obstruction was reported, in 1946, about midway between this rock and the eastern extremity of the island.

Lights.—Fog signal.—A light is exhibited, at an elevation of 130 feet (39^m6), from an octagonal tower, 33 feet (10^m1) in height, painted red and white in vertical stripes, situated on the northern slope of Ch'ing hsü; the keepers' dwellings and boundary wall are white. A fog signal is occasionally sounded from the lighthouse.

A light is exhibited, at an elevation of 300 feet (91^m4), from a white hut, 10 feet (3^m0) in height, situated on the summit of Ta-t'an. The lantern is raised through the roof of the hut when lighted, but the building is not conspicuous.

Charts 3449, 1767.

Outer harbour.—The Outer harbour extends generally north-westward for about 7 miles from its entrance between Ch'ing hsü and Jih hsü (*Lat.* 24° 23' N., *Long.* 118° 08' E.), and includes the southern part of the channel between Ku-lang hsü, which lies off the south-western corner of Hsia-men tao, and Sung-hsü pan-tao, a peninsula on the mainland westward. The harbour is easy of access, and a pilot is unnecessary; it has general depths of from 7 to 16 fathoms (12^m8 to 29^m3), good holding ground.

The south-western side of the Outer harbour is formed by the coast between Pagoda point and Kuching-sia, a point situated about 5 $\frac{1}{2}$ miles north-westward; the northern side is formed by Hsia-men tao, Ku-lang hsü, and the eastern part of Sung-hsü pan-tao.

The harbour also includes that part of the estuary of Chiu-lung Chiang or West river (Chart 1760) lying eastward of Ch'i hsü (page 122).

Charts 1760, 1968, 2412, 1262, 1263.

Chart 1767.

Southern side.—Island.—Dangers.—The coast between Pagoda point and Hsü-tzu wei, situated nearly $3\frac{1}{2}$ miles north-westward, forms a bight encumbered by partly drying flats terminating seaward in Tai-p'an-chien t'an, which extends south-eastward from Hsü-tzu wei to a position about midway between Pagoda point and Ch'ing hsü. There are general depths of from $1\frac{1}{2}$ to 3 fathoms (2^m3 to 5^m5) on Tai-p'an-chien t'an, but about midway between Pagoda point and Hsü-tzu wei there is a patch with a depth of only 3 feet (0^m9); within the south-eastern end of the shoal there is deeper water until northward of Chou-po chou, which consists of two islets lying about three-quarters of a mile north-westward of Pagoda point. The western islet of Chou-po chou is 100 feet (30^m5) high. Kang-be-kang creek is entered westward of Chou-po chou, but dries 8 feet (2^m4), except for a narrow channel in the middle of the entrance.

Chart 3449.

Shoal water, with drying rocks, extends about 2 cables eastward and northward from Hsü-tzu wei; Hsü-tzu, an islet 41 feet (12^m5) high, lies on the edge of the bank northward of the point.

The coast between Hsü-tzu wei and Kuching-sia, situated about $2\frac{1}{2}$ miles westward, rises a short distance within to hills over 200 feet (61^m0) high, and is mostly fringed by a broad, drying bank of mud and sand with boulders on it. Nian-kang su, an islet 58 feet (17^m7) high, lies on the edge of the bank nearly one mile eastward of Kuching-sia, and opposite the centre of a deep indentation called Pah-chio-kia. A shoal, with a least depth of 3 fathoms (5^m5) over it, lies about one cable offshore about midway between Hsü-tzu wei and Nian-kang su (*Lat.* $24^\circ 25' N.$, *Long.* $118^\circ 02' E.$), and a 3-fathom (5^m5) patch lies the same distance northward of Kuching-sia.

Chart 1767.

Bac-su-a is an islet, 113 feet (34^m4) high, lying about 3 cables offshore westward of Kuching-sia.

Chart 3449.

Chinta, a rock with a depth of $1\frac{1}{2}$ fathoms (3^m2) over it, lies fully one mile north-westward of Hsü-tzu wei and about 4 cables offshore; a $3\frac{1}{2}$ fathom (6^m4) patch lies about one cable eastward of the rock. About a quarter of a mile westward of Chinta is a bank, with depths of less than 5 fathoms (9^m1) over it, which extends about three-quarters of a mile northward from the coast.

Ch'i hsü, 198 feet (60^m3) high, situated in the western part of the Outer harbour, lies with its eastern extremity about $1\frac{1}{4}$ miles northward of Kuching-sia. A shoal, with depths of less than 3 fathoms (5^m5) over it, extends fully three-quarters of a mile eastward from the island.

Northern side.—Dangers.—Buoys.—Piers.—Mooring buoys.—Pai-shih t'ou, the southern point of Hsia-men tao, is sandy. The edge of the coastal bank, with depths of less than 3 fathoms (5^m5) over it, which extends from this point south-eastward to Erh-t'an and Ta-t'an islands (page 121), lies about one mile southward of Pai-shih t'ou; this bank gradually decreases in width westward, so that by Fan-chiang shih, situated on the beach about $2\frac{1}{2}$ miles westward of Pai-shih t'ou, it is only about $1\frac{1}{2}$ cables wide. Several rocks, which dry, lie within a distance of $1\frac{1}{2}$ cables southward and half a mile south-westward of Pai-shih t'ou; among them are Thoa-thau-tia and

Chart 3449.

Goa-phoah, drying 15 and 5 feet (4^m6 and 1^m5), respectively. Sai-kota, a small islet, and Choa-chinta, which dries 5 feet (1^m5), lie about $1\frac{1}{2}$ miles westward of Pai-shih t'ou. Hung-wan feng, 1,113 feet (339^m2) high, (chart 1767) lies about $2\frac{1}{2}$ miles north-north-westward of Pai-shih t'ou, and is the highest peak of the hilly land in the southern part of Hsia-men tao. Kim-kau 261 feet (79^m5) high, is a hill about a quarter of a mile northward of Pai-shih t'ou. *Chart 1764.*

Fan-chiang shih, also known as Cornwallis stone, is a triangular-shaped rock, 10 feet (3^m0) high, and is whitewashed; about $1\frac{1}{2}$ miles east-south-eastward of this stone there is a prominent hangar, a grey building with a white roof.

A shoal was reported, in 1940, about half a mile southward of Fan-chiang shih. Tso-yen shih lies about $3\frac{1}{2}$ cables south-westward of Fan-chiang shih, and has a depth of 19 feet (5^m8) over it; a black buoy, surmounted by a black spherical cage, is moored off the south-eastern side of the rock. Yu-yen shih, with a depth of 15 feet (4^m6) over it, lies about half a cable westward of Tso-yen shih (*Lat.* $24^{\circ} 26' N.$, *Long.* $118^{\circ} 05' E.$).

Ku-lang hsü (yü) lies close south-westward of Hsia-men tao, the channel between forming a portion of the Inner harbour. The island is hilly and picturesque, with large dark boulders on the hills, and numerous European houses surrounded by trees on the slopes. The summit is Yen-tzu ting or Jih-kuang yen, 250 feet (76^m2) high, situated on the southern side of the island; the flagstaff of the lookout station, which stands on a whitewashed boulder on Yen-tzu ting, is prominent from the Outer harbour. A prominent boulder, named Ying-pi yen, stands on a hill 107 feet (32^m6) high in the northern part of the island. The former British Consul's residence, situated in the south-eastern part of the island is also prominent.

A shoal, with depths of 30 feet (9^m1) on its outer edge and decreasing gradually towards the coast, extends nearly three-quarters of a mile south-eastward from the south-eastern side of Ku-lang hsü, between Fu-ting shih, the eastern point of the island, which is 80 feet (24^m4) high, and Hsiao-yin t'ou, lying about 4 cables south-westward; the inner part of this shoal dries. Wai-chien chiao, 65 feet (19^m8) high, lies about 2 cables eastward of Hsiao-yin t'ou and close offshore. Yin-tou shih, a ridge which dries, having two rocks on it which dry 15 and 13 feet (4^m6 and 4^m0), respectively, lies about one cable south-eastward of Wai-chien chiao.

Charts 1764, 3449.

The coast of Ku-lang hsü between Hsiao-yin t'ou and Druid head, situated about three-quarters of a mile west-north-westward, is bordered by flats which dry in parts. Hou-tung yen, 70 feet (21^m3) high, lies about midway between these two points; a reef, which dries 10 feet (3^m0), extends about half a cable southward from Hou-tung yen. Anson spit, situated about $2\frac{1}{2}$ cables westward of Hou-tung yen, is a narrow ridge with a least depth of $1\frac{1}{2}$ fathoms (3^m2) over it. Ku-lang shih, 19 feet (5^m8) high, lies close inshore nearly 3 cables north-westward of Hou-tung yen. Quarry point is the south-western extremity of Druid head. A rock, which dries 15 feet (4^m6), lies about one cable southward of Quarry point, and two rocks, which dry, lie about half a cable westward of this point.

Charts 1767, 1760, 1968, 2412, 1262, 1263.

Charts 1764, 3449.

The western coast of Ku-lang hsü, between Quarry point and Chou-tzu (Chow-tzu) wei, a small peninsula situated about half a mile northward, is fringed by a flat which dries; the outer edge of this flat is steep-to, but there are several detached dangers close outside it. Ching-sia is a group of rocks lying on the flats about $1\frac{1}{2}$ cables northward of Quarry point, and one of them is 23 feet (7^m0) high. Chiong-kun-ta is a rock one foot (0^m3) high, with several rocks which dry around, lying about one cable westward of the northern extremity of Chou-tzu wei; a ridge, with depths of from $4\frac{1}{2}$ to $5\frac{1}{2}$ fathoms (7^m8 to 10^m5) over it, extends nearly 2 cables south-south-westward from Chiong-kun-ta.

Chart 3449.

Sung-hsü pan-tao, the peninsula in the north-western part of the Outer harbour, is hilly; the highest peak, named Kieng-kau-chem, attains an elevation of 442 feet (134^m7). On the north-eastern side of the peninsula is an extensive bight nearly filled with drying flats, and Ta hsü (Kiu-sung seu), 190 feet (57^m9) high, lies off its north-eastern point. Ching pi (*Lat. $24^\circ 27' N.$, Long. $118^\circ 02' E.$*), the south-eastern extremity of the peninsula, rises to a hill 273 feet (83^m2) high, with a yellow tower on its summit. Cass spit, with depths of less than 3 fathoms (5^m5) over it, extends about 4 cables south-eastward from Ching pi. Tiem-buta or Minerva rock, with a least depth of one fathom (1^m8) over it, lies nearly $4\frac{1}{2}$ cables south-eastward of Ching pi; a black conical buoy, marked "Minerva" in white letters, is moored about one cable south-eastward of this rock. Vessels should not pass between this buoy and Sung-hsü pan-tao. The north-eastern extremity of the peninsula is occupied by the buildings of a large oil company, including some large oil tanks. Four piers extend from the coast here; the northernmost of these is a stone landing pier; the southernmost pier is 400 feet (121^m9) in length; the next pier northward is 600 feet (182^m9) in length, and a vessel 500 feet (167^m6) long, with a draught of 30 feet (9^m1), can berth here. There are four mooring buoys off the head of the latter pier.

Charts 1764, 3449.

Anchorage.—Vessels can anchor off the southern entrance to the channel between Hsia-men tao and Ku-lang hsü, in a depth of about 39 feet (11^m9), mud, about $1\frac{1}{2}$ cables northward of Yu-yen shih, with Fan-chiang shih bearing 090° , and Huang chiao (page 126), bearing 326° ; this position is as near the town as a vessel can approach without having to moor.

Anchorage can be obtained off the southern side of Ku-lang hsü, in depths of from 7 to 10 fathoms (12^m8 to 18^m3), within a distance of half a mile south-westward of Hsiao-yin t'ou. In 1932 H.M.S. *Hermes* anchored with the signal station near Fu-ting shih bearing 036° , distant 14 cables, with good holding ground of sand and mud. In 1935 H.M.S. *Suffolk* anchored with this signal station bearing 026° , distant about three-quarters of a mile, but strong eddies were experienced one hour before and after slack water during spring tides; vessels anchored about one cable westward of this position were not affected.

There is anchorage, in depths of from 7 to 12 fathoms (12^m8 to 21^m9), in the southern parts of the channel between Ku-lang hsü and Sung-hsü pan-tao.

Charts 1767, 1760, 1968, 2412, 1262, 1263.

Charts 1764, 3449.

See also Article 3 of the Harbour regulations on page 129 for anchorages reserved for vessels with mineral oil or explosives, and anchorage for quarantine purposes.

Chart 1767.

Anchorage is available in a typhoon about $1\frac{1}{2}$ miles westward of the light-structure on Ta-t'an island (page 121).

Chart 1764.

Landing.—In fine weather landing can be effected by pulling boats on the sandy beach immediately southward of the telegraph office situated near Hsiao-yin t'ou. Landing can be effected at any state of the tide on Chiang-tzu-hou beach, situated north-westward of the telegraph office, but it is more exposed than the former beach.

Charts 3449, 1767.

Prohibited anchorage.—Cables.—Owing to the existence of submarine telegraph cables, anchorage is prohibited southward of Ku-lang hsü within the area defined by pecked lines on the charts.

A submarine cable crosses the approach to the Inner harbour between Ku-lang hsü and the mainland eastward, in the vicinity of Wai-hu-ting chiao (page 128). See page 37.

Chart 3449.

Tidal streams.—The tidal streams in the Outer harbour set north-westward during the rising tide and south-eastward during the falling tide, with a maximum rate of about 2 knots at spring tides, except off Hsü-tzu wei (*Lat. 24° 24' N., Long. 118° 04' E.*), where this rate may be exceeded.

The tidal streams between Ku-lang hsü and Sung-hsü pan-tao set northward during the rising tide and southward during the falling tide, with a maximum rate of from 2 to 3 knots at spring tides and one knot at neap tides.

Charts 3449, 1767, 1760.

Directions.—A vessel bound for Hsia-men chiang from southward, when steering for Tung-ting tao (page 115), should give Nan-mi-lo-fu (page 115) a wide berth. Tung-ting tao can be passed at a distance of about half a mile on either side, but a vessel of deep draught should pass eastward of it; thence she should pass eastward of Channel shoals. When Ch'ing hsü is open north-eastward of Wu hsü, course may be shaped for Ta-t'an island; when Hsü-tzu wei is well open north-eastward of Ch'ing hsü bearing about 304°, which leads north-eastward of Ta chiao, a vessel can steer for the entrance of the Outer harbour, passing between Ch'ing hsü and Jih hsü. Nantai pagoda is a good landmark, but it is often obscured by clouds during the south-west monsoon.

A vessel approaching from north-eastward should give Pei-ting tao (page 134) a berth of about 2 miles to avoid the off-lying shoals; thence she should pass Liao-lo wei at a distance of not less than one mile and in a depth of not less than 6 fathoms (11^m0); course may then be shaped to pass southward of Chin-men tui-tsui, but a vessel of deep draught must pass southward of Spit bank. After passing Chin-men tui-tsui the entrance to the Outer harbour may be steered for.

Chart 1764.

Inner harbour.—General remarks.—Depths.—The Inner harbour lies between Hsia-men tao and Ku-lang hsü, and also includes the

Charts 1968, 2412, 1262, 1263.

Chart 1764.

northern part of the channel between Ku-lang hsü and the mainland. The harbour limits are defined in Article 2 of the Harbour regulations on page 129. That portion of the Inner harbour between Hsia-men 5 tao and Ku-lang hsü is somewhat restricted by rocks and banks extending from both shore; the bottom in this part of the harbour is very uneven, and if cables foul the rocks they are only recovered, if at all, with great difficulty.

Vessels should not attempt to enter until they are boarded by the 10 Harbour-master or a pilot, as they must be berthed and the harbour is frequently crowded with shipping.

Vessels of any draught can proceed into the Inner harbour. The length of a vessel is of more importance in anchoring or mooring than the draught. Vessels drawing up to 30 feet (9^m1) can use any of the 15 mooring berths (page 129) except the three "P" berths.

At high water, vessels of any draught can proceed round Ku-lang hsü.

Coast between Hsia-men tao and Ku-lang hsü.—Island and dangers.

—**Buoy.—Beacons.**—The north-eastern shore of the Inner harbour 20 is formed by the coast of Hsia-men tao, which trends north-westward from Fan-chiang shih (page 123) for about 2 miles before turning abruptly eastward into a large shallow indentation. The entrance to a boat harbour lies about half a mile north-westward of Fan-chiang shih (*Lat.* 24° 26' N., *Long.* 118° 05' E.); beyond this point, the 25 whole of the waterfront is built up.

Petroleum pier lies about 3 cables north-westward of the entrance to the tidal basin; Pang shih, which dries 8 feet (2^m4) lies close offshore about three-quarters of a cable north-westward of this pier.

There is a pontoon about 6 cables north-north-westward of Pang 30 shih, and two more a little further in the same direction.

The bank extending south-eastward from Ku-lang hsü, together with Wai-chien chiao, Yin-tou shih, and Fu-ting shih, was described on page 123.

Huang chiao, 30 feet (9^m1) high, lies about three-quarters of a 35 cable eastward of Fu-ting shih and just within the outer edge of a rocky ledge extending from that point.

Chi shih, 10 feet (3^m0) high, lies about half a cable northward of Fu-ting shih.

A jetty with a tower at its outer end extends north-eastward from a 40 position nearly 2 cables north-north-westward of Fu-ting shih. Niu-ti chiao, which dries and is marked by a perch surmounted by a white sphere, lies close off the outer end of this jetty, and Lu-erh chiao, 25 feet (7^m6) high, lies further inshore in the same vicinity. Hsin-lu-tou beach lies between Fu-ting shih and this jetty, and Hsin- 45 lu-tou jetty lies close westward of it, with a perch, surmounted by a white sphere, near its outer end.

Yu-tzu-ma chiao (*Lat.* 24° 27' N., *Long.* 118° 04' E.), 12 feet (3^m7) high, lies about one cable north-westward of Hsin-lu-tou jetty, with Hsi-tzu jetty between.

50 Chang-yu chiao is a drying rock lying about one cable northward of Yu-tzu-ma chiao; it is marked by a black granite obelisk, 17 feet (5^m2) in height, surmounted by a sphere. Yao shih, with a depth of 5 feet (1^m5) over it, lies about half a cable south-eastward of Chang-yu chiao.

Chart 1764.

Kou-tou chiao, on which a lighted beacon is situated (*see* below), and which dries 9 feet (2^m7), lies close north-westward of Lung-tou jetty, which lies south-westward of Chang-yu chiao; rocks extend for a further 20 yards (18^m3) outside the beacon. 5

Huang-chia-tu jetty lies about three-quarters of a cable westward of Kou-tou chiao, near the eastern end of The Bund.

Mien-chien chiao, which dries and is marked by a perch surmounted by a white sphere, lies about half a cable northward of Huang-chia-tu jetty. 10

Chiang-hsin (Kiang-hsin) chiao, situated nearly 1½ cables north-westward of Chang-yu chiao, is a rocky reef which dries 11 feet (3^m4); a black granite obelisk, 15 feet (4^m6) in height, stands on its north-eastern part, and there is a tide pole near the beacon.

Shui-chih chiao, which dries 15 feet (4^m6), lies about one cable westward of Chiang-hsin chiao; a perch surmounted by a white sphere marks its outer side. 15

Ho-chi and San-chui-t'ien (Sanchiutieng) jetties lie nearly opposite Shui-chih chiao.

Niu-tsao chiao, which dries 3 feet (0^m9) and is marked by a perch surmounted by a white sphere, lies about 2½ cables north-westward of Shui-chih chiao. A buoy marks the 3-fathom (5^m5) line about half a cable south-eastward of Niu-tsao chiao. 20

Lights.—No. 2 light is exhibited, at an elevation of 25 feet (7^m6), from a mast on the western side of Hsia-men tao, about 3 cables north-westward of Fan-chiang shih. 25

Two lights, disposed vertically, are exhibited from a derrick on the head of the Petroleum pier on the eastern side of the harbour.

A light is exhibited from a position in front of the Custom house, situated in the northern part of the eastern side of the harbour about three-quarters of a mile from Petroleum pier. 30

No. 1 light is exhibited, at an elevation of 159 feet (48^m5), from a mast at the signal station at Sheng-chi shan, on the south-eastern side of Ku-lang hsü.

A light is exhibited, at an elevation of 18 feet (5^m5), from a granite obelisk, painted black and white in horizontal bands, situated on Kou-tou chiao. 35

Islands and dangers in northern part of Inner harbour.—**Buoy.**—**Beacons.**—A flat, which dries, extends about 2 cables northward from Yen-tzu wei, the northern extremity of Ku-lang hsü, and this flat is prolonged northward by Niao-fen chiao, and terminates about half a mile northward of Yen-tzu wei in Nei-tu wei; a red conical buoy, with a red topmark, is moored off the eastern side of the northern end of Nei-tu wei. 40

Wu-chi chiao and Wai-hsien chiao, are situated on the above flat between Yen-tzu wei and Niao-fen chiao; both dry and each is marked by a perch surmounted by a white sphere. 45

A bank, with depths of less than 30 feet (9^m1) over it, extends from the eastern side of the northern entrance of the Inner harbour to within 1½ cables of Nei-tu wei. Pan shih, with a depth of 6 feet (1^m8) over it, lies on this bank about 1½ cables offshore, and some rocks, which dry, lie about 1½ cables further northward. 50

Hou hsü (yu) (*Lat.* 24° 28' N., *Long.* 118° 03' E.), lies about three-quarters of a mile north-north-westward of Yen-tzu wei; a ridge,

Charts 3449, 1767, 1760, 1968, 2412, 1262, 1263.

Chart 1764.

with depths of from 2 to 5 fathoms (3^m7 to 9^m1) over it, extends nearly a quarter of a mile south-south-westward from the southern side of this island.

- 5 Huo-shao hsü or Chalk islets (chart 1760) consist of six islets extending about three-quarters of a mile in a north-north-east and south-south-west direction; the southern islet is 51 feet (15^m5) high, and lies nearly one mile north-westward of Hou hsü; the northern islet is 125 feet (38^m1) high; the lower parts of these islets are
10 white.

Dangers in the fairway.—Buoyage.—Beacon.—Wai-hu-ting (Wai-hu-tin) chiao, lying in the middle of the southern entrance and about 4 cables south-eastward of Fu-ting shih, is awash; foul ground extends about a quarter of a cable southward and south-eastward of
15 this rock. Chang-fu-chien, a rock with a depth of 14 feet (4^m3) over it, lies about half a cable north-westward of Wai-hu-ting chiao. A black and white chequered buoy is moored about a quarter of a cable eastward of Wai-hu-ting chiao, and a red and white chequered buoy is moored about three-quarters of a cable westward of it.

- 20 Chung chiao, with a least depth of 14 feet (4^m3) over it, lies nearly $1\frac{1}{2}$ cables northward of Wai-hu-ting chiao; a black buoy is moored off its north-eastern side. A rock, with a depth of 28 feet (8^m5) over it, lies about one cable west-north-westward of Chung chiao.

- 25 Nei-hu-ting chiao consists of three rocky heads, and the southernmost, with a depth of 7 feet (2^m1) over it, lies about 2 cables eastward of Fu-ting shih; the other two have depths of 13 and 14 feet (4^m0 and 4^m3) over them, respectively. A red and white chequered buoy, surmounted by a black spherical cage, is moored off the south-
30 western side of these rocks.

Cha shih, with a least depth of 19 feet (5^m8), over it, lies about $1\frac{1}{2}$ cables northward of Chiang-hsin-chiao beacon (page 127).

- Hung-niu shih, with a depth of 13 feet (4^m0) over it, lies nearly $3\frac{1}{4}$ cables north-westward of Chiang-hsin-chiao beacon (*Lat.* $24^{\circ} 27'$
35 *N.*, *Long.* $118^{\circ} 04' E.$).

Kuan-chai chiao, lying nearly $1\frac{1}{2}$ cables north-westward of Hung-niu shih, dries, and is marked by a black granite obelisk, 22 feet (6^m7) in height.

- Nei-sha shih, with a least depth of 9 feet (2^m7) over it, lies about $1\frac{1}{2}$
40 cables north-eastward of Kuan-chai chiao; a red and black chequered buoy is moored off its north-western side. A rocky patch, with a least depth of 28 feet (8^m5), lies about $1\frac{1}{4}$ cables north-north-westward of Nei-sha shih.

- Anchorage.—Mooring berths.**—Large vessels of war usually moor
45 from $3\frac{1}{4}$ to 8 cables south-south-westward of Hou hsü; vessels at single anchor are liable to drag, as the bottom is soft mud with patches of gravel, but, in 1928, H.M.S. *Titania* found good holding ground with the summit of Hou hsü bearing 023° , distant $6\frac{1}{4}$ cables. This anchorage is convenient during the north-east monsoon, when
50 there is generally a swell on Ku-lang-hsü beaches, as fairly good landing can be effected at the disused custom house on Chou-tzu wei (*Lat.* $24^{\circ} 27' N.$, *Long.* $118^{\circ} 03' E.$). Good anchorage can also be obtained between Hou hsü and the coast of Hsia-men tao south-eastward.

Charts 3449, 1767, 1760, 1968, 2412, 1262, 1263.

Chart 1764.

There are numerous mooring berths in the inner harbour, the positions of which can best be seen on the chart, where they are indicated by a letter, or a letter and a number, within a circle, thus :—

(V) or (P₁). A vessel is directed to a berth by a signal flag of the ⁵ International Code of Signals hoisted under the National or House flag at the signal station on Ku-lang hsü. A U.S. Naval vessel, in 1939, reported good holding ground at "W" mooring berth.

See also Article 3(a) of the Harbour regulations below.

There are a number of mooring buoys for vessels of the various ¹⁰ steamship companies using the harbour, and the positions of these are best seen on the chart.

Cables.—Two submarine cables, indicated on the chart, are laid across the Inner harbour. See page 37.

Tidal streams.—In the Inner harbour the tidal streams set north- ¹⁵ ward and southward, each running for about 6½ hours. The average rate of the north-going stream is from 2 to 3 knots at spring tides; the rate of the south-going stream during the first 3 hours is about 3 knots. In the middle of the harbour the north-going stream runs from three-quarters of an hour before low water to a quarter of an ²⁰ hour after high water.

Charts 1764, 3449.

Harbour regulations.—The following are extracts from the Harbour regulations for the Port of Hsia-men which were in force in 1948 :—

Art. 1.—The term "vessel" in these regulations refers to vessels ²⁵ of foreign type. Regulations concerning native-type craft are embodied herein only in so far as is necessary for their due control when working in connection with foreign type vessels.

Art. 2.—The upper limit of the harbour is a line drawn from Hsint'ienti (north-westward of the town of Hsia-men and close ³⁰ northward of Hsia-men dock) north-westward through the southern islet of Huo-shao hsü (Chart 1760) to the mainland opposite; the lower limit is a line drawn south-eastward from Pai-shih t'ou (the southern point of Hsia-men tao) to the nearest island and thence to the mainland in the direction of ³⁵ Nantai pagoda (*Lat. 24° 20' N., Long. 118° 04' E.*).

This area comprises an Inner and Outer harbour. The limits of the Inner harbour are as follows :—

The southern limit is a line drawn 090° from the eastern point ⁴⁰ of Wai-chien chiao to the coast of Hsia-men tao.

The northern limit is a line drawn from the northern extremity ⁴⁰ of Chou-tzu wei to the southern point of Ta hsü, thence from the northern point of Ta hsü to the southern point of Hou hsü, and thence a line drawn 045° from the north-eastern point of ⁴⁵ Hou hsü to the upper limit of the harbour.

Art. 3.—The anchorages for foreign-type vessels are :—

(a) For vessels other than those provided for in (b), (c), and (d) : ⁵⁰ within the limits of the inner harbour as defined in the preceding article. If, owing to unusual length or draught of vessels, or for other sufficient reason, the anchorages ⁵⁰ within the Inner harbour would not be convenient, application should be made to the Harbour-master, if possible before the vessel's arrival, to assign a suitable berth in the Outer

Charts 1767, 1760, 1968, 2412, 1262, 1263.

Charts 1764, 3449.

harbour; application should be made at the same time to the Commissioner of Customs for permission to work cargo from the berth so assigned.

- 5 (b) For mineral oil: within either of the two following areas in the Outer harbour:—

10 (1) Within the limits of lines drawn south-westward from the north-eastern point of Ta hsü to Ching pi; from Ching pi 090° to the point of intersection of a line drawn 180° from the north-eastern point of Ta hsü, but limited northward by the line drawn from the northern extremity of Chou-tzu wei to the southern point of Ta hsü.

(2) Southward of the lower limit of the Inner harbour to a line drawn from Fan-chiang shih.

- 15 (c) For explosives: southward of a line drawn from Ching pi to Yin-tou shih.

(d) For quarantine purposes: the quarantine anchorage is situated southward of the southern limit of the mineral oil anchorage and off Fan-chiang shih (*Lat. 24° 26' N., Long. 118° 05' E.*).

20 Art. 4.—A vessel entering the port must stop above or below the shipping until the Harbour-master has assigned her a berth.

Art. 5.—Vessels having determined berths are allowed to proceed to them without stoppage.

25 Art. 6.—Vessels shall moor in accordance with instructions received from the Harbour-master, and shall not shift their berths without a special permit, except when outward bound after having obtained their clearance papers or through stress of weather.

30 Art. 7.—Applications for berths or for permission to shift berth must be made at the Harbour-master's office by the agents, the master, the first officer, or the pilot in charge, when the necessary instructions concerning the berth will be given. If a vessel is instructed by the Harbour-master to shift her berth, she shall do so.

35 Art. 8.—Vessels having explosives on board shall hoist flag B of the International Code of Signals at the fore by day, and exhibit a red light at night; in regard to the discharge of the same, they shall abide by the instructions received from the Customs.

40 Art. 19.—Vessels having any infectious disease on board, or any disease suspected to be infectious, or the body of a person who died, or is suspected of having died, of an infectious disease, shall hoist the quarantine flag on approaching the port, anchor as provided in Article 3 (d), and keep the flag flying until pratique has been granted.

45 Art. 27.—Ballast, ashes, refuse, etc., must not be thrown in to the harbour. Vessels wishing to discharge ashes or other refuse should hoist flag Y of the International Code of Signals at the fore, when a licensed ash-boat will attend and take delivery.

50 Art. 31.—Vessels in the harbour and its approaches are forbidden to proceed at such a speed as renders their wash dangerous to other craft.

Art. 34.—No vessels, except men-of-war, may use swinging booms. Swinging booms should be rigged in from sunset to sunrise.

Charts 1767, 1760, 1968, 2412, 1262, 1263.

Charts 1764, 3449.

Art. 36.—All vessels shall keep on board a sufficient number of hands to clear and pay out cables and to handle the vessel in case of emergency. The hawse must always be kept clear. No boats, warps or lines must be made fast to any of the buoys or beacons which constitute harbour marks. 5

Art. 37.—In case of fire occurring on board a vessel in port, the fire bell must be rung immediately by that vessel and by those above and below her. By day the signal NQ of the International Code must be hoisted by the burning vessel, if possible, and also by those vessels above and below her; at night a light should be lowered and hoisted repeatedly. The Harbour-master should be notified immediately. 10

Art. 38.—The use of steam whistles, sirens, or other sound signals, except for the purpose of signalling in accordance with the Regulations for Preventing Collisions at Sea or for the purpose of warning vessels of danger, is strictly forbidden. 15

Port signals.—For special signals in use in the port, *see* page 32.

Vessels allotted special numbers under the Port Signal Code are required to hoist the same when, approaching the harbour, they are off Wu hsü (*Lat. 24° 20' N., Long. 118° 09' E.*). 20

Chart 1764.

Directions.—Vessels usually enter the Inner harbour during the daytime; vessels sometimes leave on a clear night and with a pilot in charge. It is difficult to turn round, and it is not advisable to let go an anchor and turn, as the anchor might foul one of the many buoy moorings. Vessels arriving during the south-going tidal stream proceed direct into the Inner harbour by the southern entrance; those arriving during the north-going stream pass southward and westward of Ku-lang hsü, and enter the harbour by the northern entrance. Vessels leaving the harbour during the south-going tidal stream proceed through the northern entrance and round Ku-lang hsü; those leaving during the north-going stream proceed direct through the southern entrance. With the north-going tidal stream there may be a strong easterly set in the southern entrance to the Inner harbour, which must be guarded against, especially by vessels using the western channel past Yu-yen shih, Chang-fu-chien, and Nei-hu-ting chiao; a westerly set may sometimes occur soon after the south-going stream has commenced in the Inner harbour. There is deep water at the berths in the harbour, and it is, therefore, the length of a vessel that must be taken into consideration when berthing, not her draught. 25 30 35 40

A vessel proceeding into the Inner harbour by the eastern channel must take care to avoid the shoal, reported in 1940, about half a mile southward of Fan-chiang shih. She should steer to pass eastward of the black buoy marking Tso-yen shih; thence hold the Hsia-men-tao shore, passing eastward of the buoys moored off the eastern sides of Wai-hu-tin chiao and Chung chiao, respectively. When past Nei-hu-ting chiao a vessel can keep in mid-channel by keeping the southern islet of Huo-shao hsü (*Chart 1760*) just open north-eastward of the north-eastern side of Hou hsü, bearing 324°, but this line passes rather close to Cha shih. 45 50

Vessels intending to enter the Inner harbour by the northern entrance pass southward of the shoal water extending south-eastward

Charts 1767, 1760, 1968, 2412, 1262, 1263.

Chart 3449.

from Ku-lang hsü. The wide channel between this island and Sung-hsü pan-tao presents no difficulty, taking care to give Anson spit, Chiong-kun-ta (*Lat. 24° 27' N., Long. 118° 03' E.*), and the other rocks and shoals off the western coast of Ku-lang hsü, a wide berth. Vessels must pass northward and eastward of the buoy marking Nei-tu wei; caution must be exercised here, as the directions of the tidal streams are uncertain about the time of high and low water, and the south-going stream sets directly on to the buoy. The southern islet of Huo-shao hsü open north-eastward of the north-eastern side of Hou hsü, bearing 324°, leads clear of Nei-tu wei and Niao-fen chiao. Vessels should pass at least half a cable westward of the buoy marking Nei-sha shih; the channel eastward of this rock should not be used.

15 *Chart 1764.*

Directions for boats.—Boats making for the Inner harbour from the anchorage southward of Ku-lang hsü can cross the shoal bank extending south-eastward from this island; the outer limit of the dangerous ground on this bank is well defined by Yin-tou shih, as two of the rocks on it dry 15 and 13 feet (4^m6 and 4^m0), respectively. At low water boats should pass about a cable southward of these rocks and then steer for the Petroleum pier, or the buildings of the Petroleum Company, until Huang chiao is open westward of Hsia-men tao, bearing about 340°, when they can safely turn up the harbour.

Charts 1764, 3449.

At low tide boats approaching the Inner harbour from the anchorage between Ku-lang hsü and Sung-hsü pan-tao should either go round, or pass close inside the buoy marking Nei-tu wei. When near high water, however, there is a passage between the rocks lying on the drying flat extending from the northern end of Ku-lang hsü; Ching pi in line with Chiong-kun-ta, bearing 241°, leads through this passage and close northward of a rock, which dries 12 feet (3^m7), lying about three-quarters of a cable northward of Yen-tzu wei. Boats should continue on this mark until near Kuan-chai-chiao beacon, bearing in mind that a rock, which dries 5 feet (1^m5), lies nearly one cable westward of this beacon and almost on the leading line.

The most convenient landing place on the Ku-lang hsü side of the Inner harbour is at Lung-tou jetty (page 127), situated northward of the British Consulate; boats can proceed alongside this pier at any state of the tide.

Chart 1764.

Hsia-men city.—**Landmarks.**—The Chinese city of Hsia-men, also known as Amoy, is situated in the south-western part of Hsia-men tao, and had a population, in 1952, of about 240,000.

The foreign concessions lie along the eastern shore of the Inner harbour, where a considerable amount of land has been reclaimed and a sea wall constructed. Ku-lang hsü has become an international settlement, managing its own affairs under a municipal council elected annually, whose regulations and by-laws are subject to approval by the Chinese Government. Nearly all the Europeans reside on Ku-lang hsü, but the mercantile establishments, where much of the business is transacted, are on the Hsia-men side of the harbour.

Charts 1767, 1760, 1968, 2412, 1262, 1263.

Chart 1764.

The Tongwen Institute (*Lat. 24° 27' N., Long. 118° 04' E.*), a white building of European design on the Hsia-men side of the Inner harbour, is prominent. Two radio masts stand about a cable north-eastward of Fan-chiang shih.

5

Charts 1764, 3449.

Harbour facilities.—Supplies.—Communications.—It was reported, in 1943, that two of the pontoons on the eastern side of the Inner harbour had a depth of 22 feet (6^m7) alongside. For depths alongside piers at Sung-hsü pan-tao, in the Outer harbour, *see* page 124.

10

Chart 1764.

Repairs can be executed. There is a dry dock, belonging to the Chinese Government, situated on the eastern side of the northern entrance to the Inner harbour; *see* Appendix I, page 706.

There is a quarantine hospital and two general hospitals; one of the latter, the Hope and Wilhelmina hospital, has 110 beds, and will accept seamen.

Ample quantities of coal can be obtained. Fuel oil is available in large quantities.

Fresh provisions are usually plentiful. Water is supplied to vessels at anchor by water boat.

Limited quantities of engineer's and deck supplies are obtainable.

There is frequent steamship communication with Hong Kong, Shang-hai, Fu-chou, and Formosa. The city is connected to the general telegraph and telephone systems.

25

Hsia-men is connected by cable with Shang-hai and Hong Kong.

There is a radio station.

Deratisation.—*See* page 37.

Storm signals.—A storm signal station is situated on a hill, 176 feet (53^m6) high, about 1½ cables westward of Fu-ting shih (*Lat. 24° 27' N., Long. 118° 04' E.*). Storm signals are displayed. Each vessel in the harbour must hoist the answering pennant when the signal displayed has been noted. When all vessels have answered, the signal is hauled down.

Trade.—In normal times, rice, sugar, tinned vegetables, and tobacco are exported; the imports are petroleum products, cotton goods, motor car accessories, and artificial manure.

Climatic Table.—*See* Chapter I, page 65.

Charts 1767, 1760, 1968, 2412, 1262, 1263.

CHAPTER III

HSIA-MEN TO MIN CHIANG, INCLUDING HAI-T'AN HSIA.

Charts 1760, 1761.

COAST.—Hsia-men chiang to Hsing-hua wan.—General remarks.—The coast between Hsia-men chiang and the southern entrance to Hsing-hua wan (Hunghwa sound) situated about 85 miles north-eastward, is indented by several large bays, with few off-lying islands and dangers.

Wu-ch'iu hsü (Ockseu islands), described on page 141, lies about 15 miles offshore at the north-eastern end of this stretch of coast.

During the north-east monsoon there is usually a southerly or south-westerly set off this coast, outside the limit of the influence of the tidal streams; in the south-west monsoon there is frequently, though not invariably, a set in the contrary direction.

Chart 1959.

South-eastern coast of Chin-men tao.—Islets and dangers.—Mu hsü (Matthews islet), 40 feet (12^m2) high, lies about $1\frac{1}{2}$ miles east north-eastward of Liao-lo wei (*Lat.* $24^{\circ} 25' N.$, *Long.* $118^{\circ} 26' E.$), and a quarter of a mile offshore; a drying reef extends about $3\frac{1}{2}$ cables southward from the islet.

Pei-ting t'ou (Dodd head), the eastern extremity of Chin-men tao and situated about 3 miles north-eastward of Liao-lo wei, is rocky and rises to a peak nearly half a mile inland. It is fringed by numerous islets, rocks, and reefs; the easternmost reef, which dries 8 feet (2^m4), lies about half a mile offshore, and a detached reef, with a least depth of $2\frac{1}{2}$ fathoms (4^m6) over it, lies about 4 cables south-south-eastward of the southern end of the head. A rock, with a depth of less than 6 feet (1^m8) over it, lies about one mile north-eastward of Pei-ting t'ou, with a $2\frac{1}{2}$ -fathom (4^m6) patch $3\frac{1}{2}$ cables east-south-eastward of it, and a $1\frac{1}{2}$ -fathom (2^m7) patch between.

Pei-ting tao and adjacent dangers.—Light.—Fog-signal.—Pei-ting tao (Dodd island), 70 feet (21^m3) high, lies nearly 2 miles south-eastward of Pei-ting t'ou and is surrounded by a reef which extends about a quarter of a mile north-eastward. A $2\frac{1}{2}$ -fathom (4^m1) patch, on which the sea breaks occasionally, lies about $1\frac{1}{2}$ miles eastward of the island. A reef, which dries 7 feet (2^m1), lies about half a mile west-north-westward of the island, and about 2 cables westward of this reef is a rock with a depth of $1\frac{1}{2}$ fathoms (2^m3) over it. A reef with a least depth of $1\frac{1}{2}$ fathoms (2^m3) over it, lies about three-quarters of a mile northward of the island, and with any wind there are rollers on this reef.

Charts 1968, 2412, 1262, 1263.

Chart 1959.

A light is exhibited, at an elevation of 90 feet (27^m4), from a grey steel triangular framework structure on the summit of Pei-ting tao. A fog signal is occasionally sounded from the lighthouse.

On several occasions Pei-ting tao has been mistaken for Tung-ting tao (page 115); it should, therefore, be noted that Pei-ting-tao lighthouse is a grey framework structure, and Tung-ting-tao lighthouse is a black tower.

Pei-ting hang-men.—**Directions.**—**Tidal streams.**—Pei-ting hang-men (Dodd passage), situated between Pei-ting t'ou and Pei-ting tao, 10 has irregular depths of from 4½ to 9 fathoms (7^m8 to 16^m5) between the reefs on either side; its passage requires caution.

Vessels proceeding north-eastward through Pei-ting hang-men should steer for the eastern extremity of Pei-ting t'ou bearing 009°, taking care to be on that bearing before Liao-lo wei bears less than 15 280°. When Mu hsü bears 224°, keep it astern on that bearing, which will lead through the passage in depths of from 6 to 9 fathoms (11^m0 to 16^m5), but passes only about 2 cables south-eastward of the 2½-fathom (4^m6) patch lying south-south-eastward of Pei-ting t'ou.

The tidal streams in Pei-ting hang-men set north-eastward and 20 south-westward.

Charts 1959, 1760.

Wei-t'ou ao.—**General remarks.**—Wei-t'ou ao (Hu-i-tau bay) is entered between Pei-ting t'ou and Wei-t'ou chiao, situated about 6½ miles north-eastward, and lies between Chin-men tao and the main- 25 land northward.

Ta-teng tao (Twa-tin), is a fairly large island, 97 feet (29^m6) high, situated in the western part of the bay, which is largely occupied by shallow flats. Hsiao-teng hsü (Town island) lies about 2 miles eastward of Ta-teng tao, and Chiao hsü (Reef island), 41 feet (12^m5) 30 high, about one mile further in the same direction. Chung hsü (Centre island), 28 feet (8^m5) high, lies about 1½ miles south-south-westward of Hsiao-ting hsü.

East peak or Khikoe-soan, 1,390 feet (423^m7) high, and West peak or Ngchin-soan, 1,714 feet (522^m4) high, situated on the mainland, 35 about 13 and 16 miles, respectively, north-westward of Wei-t'ou chiao, are good landmarks.

Chart 1959.

Coast.—**Islets and dangers.**—From Pei-ting t'ou (*Lat.* 24° 27' N., *Long.* 118° 28' E.), the western side of the entrance to Wei-t'ou ao 40 trends about 5½ miles north-north-westward to Feng-sui chiao (Chimney point), the north-eastern point of Chin-men tao. Yai t'ou (Wall point) and Wu-hu-shan wei (Steward point) lie about 2 and 4 miles, respectively, north-north-westward of Pei-ting t'ou. Ch'ing-hsü wan (Eliza bay) lies between Wu-hu-shan wei and Feng- 45 sui chiao, and Ts'ao hsü (Eliza island) lies about half a mile offshore eastward of the latter.

Wei-t'ou chiao (Hu-i-tau point) rises to Obelisk hill, 80 feet (24^m4) high, on which is an obelisk, of a light colour and about 10 feet (3^m0) high, having the appearance of a chimney; this obelisk, however, 50 does not show up well.

A ridge, with depths of about 3½ fathoms (6^m4) on its outer end, extends half way across the bay from Yai t'ou. Reefs, on which the sea breaks heavily in bad weather, extend half a mile southward

Charts 1968, 2412, 1262, 1263.

Chart 1959.

and westward from Wei-t'ou chiao; a rock with a depth of $2\frac{1}{2}$ fathoms (5^m0) over it, and possibly less depths in the vicinity, lies about $1\frac{1}{2}$ miles south-eastward of the point. A rock, with a depth of 5 less than 6 feet (1^m8) over it, on which the s.s. *Hang Sang* struck in 1933, was reported to lie about 7 cables south-eastward of Wei-t'ou chiao. Oyster islet, a low flat rock, lies about 2 miles north-north-westward of Wei-t'ou chiao; Oyster rock, awash, lies nearly one mile southward of Oyster islet.

- 10 Sa-li-ya ch'ien-tui (Thalia bank) lies with its outer end, on which is a depth of $1\frac{1}{2}$ fathoms (3^m2), about $2\frac{1}{2}$ miles westward of Wei-t'ou chiao; thence the bank extends, with numerous rocks on it, north-westward to the mainland at the head of the bay.

Pai-lieh yen or Ta-shan chiao (White rocks) lie on Sa-li-ya ch'ien-tui, about $3\frac{1}{2}$ miles within its outer end; the highest is 9 feet (2^m7) high. Ta-po hsü (Flak islet), 143 feet (43^m6) high, lies about 2 miles north-westward of Pai-lieh yen. Koe island lies about 2 miles north-westward of Ta-po hsü, with an islet, 61 feet (18^m6) high, between. There are deep channels on the north-eastern and south-20 western sides of the bank, respectively, but the south-western channel, which has been examined by sweeping, is somewhat encumbered by reefs and requires local knowledge; the north-eastern channel terminates in a creek running northward from the northern shore of the bay. A $4\frac{1}{2}$ -fathom (8^m2) patch lies about 2 miles east-25 south-eastward of Ta-po hsü and almost in the middle of the north-eastern channel.

Anchorage.—Directions.—During the north-east monsoon there is good anchorage about half a mile south-westward of Oyster islet (*Lat.* $24^\circ 32' N.$, *Long.* $118^\circ 33' E.$), in a depth of $3\frac{1}{2}$ fathoms (6^m4); 30 also about three-quarters of a mile westward of this islet, in a depth of 5 fathoms (9^m1), taking care to give a sufficient berth to the southern end of a rocky ledge lying about 6 cables west-north-westward of the islet.

Anchorage may be obtained, in a depth of $5\frac{1}{2}$ fathoms (9^m6), with 35 the summit of Ta-po hsü bearing about 241° , distant 9 cables. To reach this anchorage the bay may be entered by steering for Oyster islet bearing 000° , and when the obelisk on Wei-t'ou chiao bears 090° alter course to 315° ; when Oyster islet bears 090° steer 303° for the anchorage, which leads close northward of the $4\frac{1}{2}$ -fathom (8^m2) patch 40 lying about 2 miles east-south-eastward of Ta-po hsü. The tidal streams must be taken into consideration; the south-western side of the channel is steep-to, and sounding gives no warning.

Coast.—Dangers.—Tidal streams.—The coast between Wei-t'ou chiao and Shen-hu chiao or Chimmoo point, situated about $8\frac{1}{2}$ miles 45 north-eastward, is comparatively low, with sandhills rising to elevations of about 300 feet (91^m4); there are several small bays, but none of them affords shelter. There are two walled towns on the coast, and there is a small pagoda near the south-western, which lies about $3\frac{1}{2}$ miles north-eastward of Wei-t'ou chiao.

50 A reef, on which the sea breaks, lies about 3 cables eastward of the point near the south-western town; several other dangers and islets exist off this stretch, the positions of which can best be seen on the chart. This part of the coast should be given a wide berth.

Scrag point or Shih-k'u-lai-k'o chiao lies about midway between

Chart 1959.

Wei-t'ou chiao and Shen-hu chiao (*Lat. 24° 37' N., Long. 118° 41' E.*).

Along the coast between Wei-t'ou ao and Shen-hu wan (*see below*) the tidal streams set north-eastward and south-westward, but their duration and rate vary with the monsoons; the direction of the tidal streams is indicated by the numerous fishing nets moored off the coast. 5

Shen-hu wan.—Islets and dangers.—Directions.—Shen-hu wan (Chimmo bay) is entered between Shen-hu chiao and Yungning point, situated about 2½ miles north-north-eastward; its shores are barren, and the walled town of Yungning is situated on the northern side of the entrance. The bay is unsafe during the south-west monsoon. Kusau hill, 760 feet (231^m6) high, with a pagoda on its summit, situated on the northern side of the bay and nearly 4 miles north-north-westward of Yungning point, is prominent; close north-eastward of this hill, and separated from it by a deep gap or valley, is a hill of about the same elevation, with two peaks. *See* view facing page 138. 10 15

A spit, with a depth of 1½ fathoms (2^m7) over the outer end, extends about 1½ miles north-north-eastward from Shen-hu chiao, and Pagoda and Sour islets lie on this spit. Chimmo rocks are two rocks which dry, the southern of which lies about half a mile northward of Sour islet. A 3-fathom (5^m5) patch lies about 1½ miles north-westward of Sour islet, and a rock which dries lies about 3 cables westward of a flat islet, about 15 feet (4^m6) high, lying close off Yungning point. Shoulder peak, situated about 6½ miles north-westward of Yungning point, bearing 311°, leads into Shen-hu wan between Chimmo rocks and Yungning point. 25

Coast.—Dangers.—Obstruction.—Junk head lies about 1½ miles north-eastward of Yungning point; Fairy rock, situated about 3 cables off the head, dries. Kusau head lies about 1½ miles north-eastward of Junk head. 30

The coast between Kusau head and Hsiang-chih chiao (Chung-chi point), situated about 5 miles north-eastward, is indented by several small bays, affording shelter to junks, but rocks and reefs extend from their shore, and vessels should not attempt to enter them without local knowledge. Ling hsü (Bell islet), 30 feet (9^m1) high, with a bell-shaped pagoda on it, lies in one of these bays and about 2 miles south-south-westward of Hsiang-chih chiao, but it is not conspicuous. Wai hsü lies about one mile north-north-eastward of Ling hsü. Hsiang-chih chiao is about 400 feet (121^m9) high, and sunken rocks extend about 3 cables south-eastward from it. 35 40

In 1922, the s.s. *Huichow* reported having struck an obstruction about 1½ miles eastward of Kusau head (*Lat. 24° 42' N., Long. 118° 44' E.*). 45

Chart 1760.

Ch'uan-chou chiang.—Islands and dangers.—The entrance to Ch'uan-chou chiang (Chinchu harbour) lies between Hsiang-chih chiao and a point situated about 10 miles north-eastward, on which Ch'ung-wu-cheng (Tongbu) is situated. *See* views facing page 138.

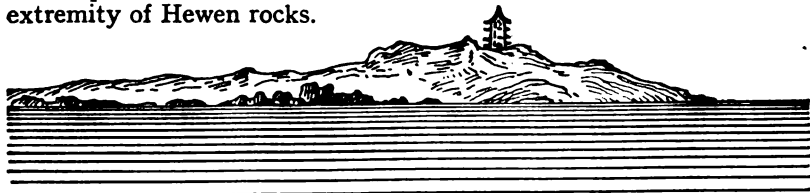
The harbour is greatly obstructed by islands, banks, and reefs, and should only be entered by vessels with local knowledge. A heavy swell rolls in when there is any wind, and the passage in is dangerous at low water to vessels of more than 10 feet (3^m0) draught. 50

Choho point, situated on the southern side of the harbour and about

Charts 1968, 2412, 1262, 1263.

Chart 1760.

3½ miles north-westward of Hsiang-chih chiao, is 230 feet (70^m1) high and has a pagoda on it; see view below. A drying sandbank extends about 1½ miles eastward from Choho point; Hewen rocks, 5 above and below water, lie eastward of this bank, and extend about 1½ miles further in the same direction. The western portion of Hewen rocks is known to the Chinese as Kung-niu chiao, and the eastern part as Nan chiao. Tung-niu shih (Tahin rock), with depths of less than one fathom (1^m8) over it, lies about 3 miles eastward of 10 Choho point, and about 4 cables east-north-eastward of the eastern extremity of Hewen rocks.



*Hewen rocks. Choho pagoda, bearing about 272°.
(Original dated 1844.)*

Hsiao-chui tao (Seatoi island) is 40 feet (12^m2) high and lies about 6 cables west-north-westward of Tung-niu shih, to which it is connected by a shallow bank. Several rocks, above water, lie close 15 westward of Hsiao-chui tao, and a rock, with a depth of one fathom (1^m8) over it, lies about 3 cables east-south-eastward of it. K'u men, the channel leading into the harbour, passes northward of Hewen rocks, and southward of Tung-niu shih and Hsiao-chui tao; a reef, having three rocky heads which dry, lies nearly in mid-channel 20 between Hewen rocks and Hsiao-chui tao.

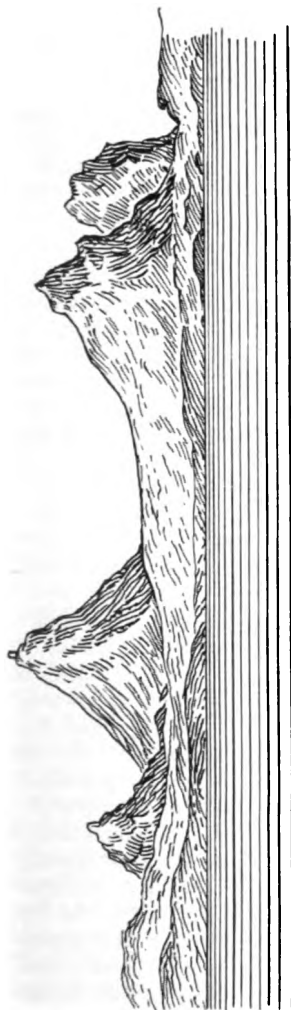
Pai hsü (Pisai islet) lies about 1½ miles north-westward of Choho point, and about half a mile eastward of this islet are Nanwu chiao, which dries 16 feet (4^m9), and Hsiennanwu chiao, which dries. Tachui tao (Tatoi island), 358 feet (109^m1) high, lies about one mile north- 25 ward of Hsiao-chui tao; an islet lies close southward of its south-eastern point. Tachui tsui (Seatoi bank) with depths of from 2 to 3 fathoms (3^m7 to 5^m5) over it, extends about 2 miles south-eastward from Tachui tao, and there are frequently overfalls on it. Hsieh sha (Boot sand), which borders the northern side of the channel leading 30 into the harbour, occupies a large portion of the harbour westward of Tachui tao. After passing Choho point, the channel trends north-westward to pass close to Wen t'ou (Wintau), which lies about 1½ miles northward of Pai hsü (*Lat. 24° 50' N., Long. 118° 42' E.*).

About 3 miles north-westward of Pai hsü is the entrance of a river; 35 Chin-chiang (Chinchu) is situated on the northern bank of this river and about 4 miles above the entrance. The channels leading to this city are shoal and intricate.

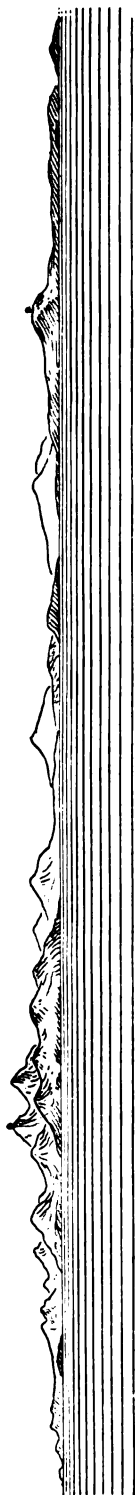
Passage island, 80 feet (24^m4) high, known to the Chinese as Fu-ting chiao, situated about 2½ miles eastward of Tachui tao, has a scorched 40 appearance; several drying rocks lie within a distance of half a mile eastward of the island, and a ledge extends nearly 2 cables westward from it.

A rock, with a depth of less than 6 feet (1^m8) over it, the position of which is approximate, was reported, in 1939, about 1½ miles 45 southward of Passage island. Ch'ih chiao (White rocks) lies about

Charts 1968, 2412, 1262, 1263.



Kusau hill, from north-eastward.
Shen-hu wan (Chimmo bay).
(Original dated 1844).

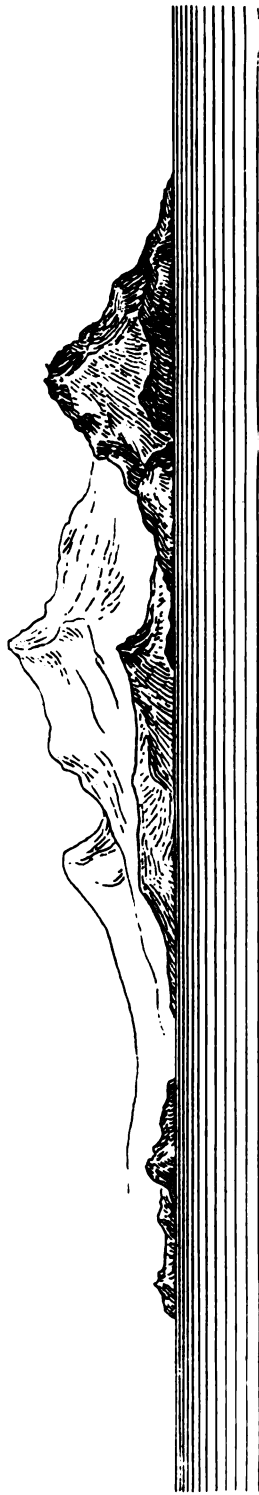


Hsiang-chih chiao
(Chung-chi point).

Kusau pagoda.

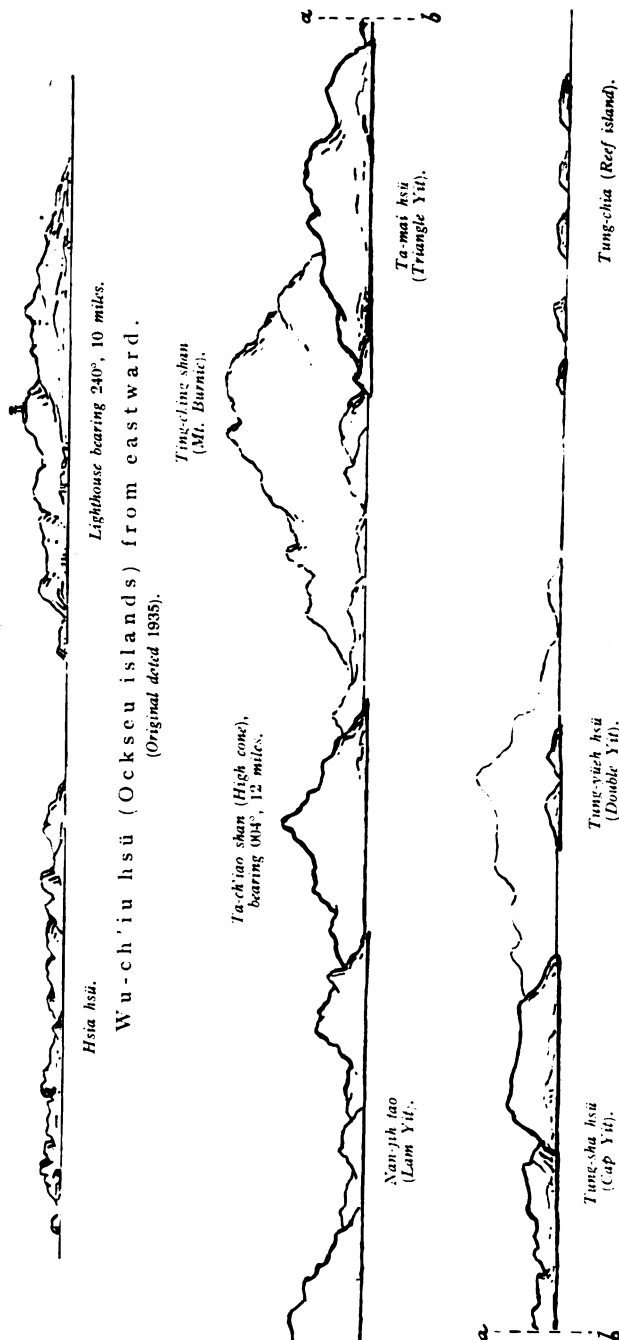
Choko pagoda.

Pai ksil
(Pisai islet).



Hsiaohui tao (Statol island).

Tachui tao (Tatol island).
Two views of Ch'uan-chou Chiang (Chinchu harbour).
(Originals dated 1844).



View, in two parts, of the approach to Hsing-hua wan (Hungwa sound).
(Original dated 1935).

Chart 1760.

half a mile north-north-eastward of Passage island, with foul ground between, and is 44 feet (13^m4) high. Taku tao (Tahkut island), situated about $1\frac{1}{2}$ miles northward of Passage island and half a mile off the northern shore of the harbour, is 200 feet (61^m0) high; it has a large village on it, and there is a fort on its southern extremity. 5

Kuanglin chiao and P'o chiao are drying rocks lying, respectively, about 4 and 3 cables off the south-eastern side of Taku tao. Ta'yang chiao is a drying reef situated about $2\frac{1}{2}$ miles east-north-eastward of Taku tao, and about one mile offshore. 10

Charts 1760, 1761.

Ch'ung-wu-cheng (Tongbu), a walled city, is situated on a point about 10 miles north-eastward of Hsiang-chih chiao, and Ch'ung-wu bay, also known as Junk anchorage, lies immediately westward of this point. 15

Peichiao shih (Juno rock), situated nearly 2 miles south-westward of Ch'ung-wu-cheng, is a group of rocky heads with a least depth of $1\frac{1}{2}$ fathoms (3^m2), and depths of from 5 to 6 fathoms (9^m1 to 11^m0) around.

Chart 1760.

Anchorage.—There is anchorage, for vessels with local knowledge, in depths of from about 7 to 10 fathoms (12^m8 to 18^m3), between Choho point and Hsieh sha; this anchorage is reached by the narrow channel between Hewen rocks and Hsiaochui tao. There is also anchorage northward of Hsieh sha, and there is smooth water here in any weather; this anchorage is approached by a channel between Tachui tao and the mainland northward. 25

Charts 1760, 1761.

Ch'ung-wu bay affords good shelter in the north-east monsoon for vessels with local knowledge, in depths of from 4 to 7 fathoms (7^m3 to 12^m8), but it is not recommended on account of the rocks off its shores. 30

Chart 1760.

Lights.—A light privately maintained is exhibited, at an elevation of 25 feet (7^m6), from a white circular tower on a square base, situated on Wen t'ou. 35

Charts 1760, 1761.

A light privately maintained is exhibited, at an elevation of 120 feet (36^m6), from a white circular tower on the south-western corner of Ch'ung-wu-cheng city wall.

Coast.—Anchorage.—Ta-tso chiao (Pyramid point), situated about 3 miles eastward of Ch'ung-wu-cheng, is 80 feet (24^m4) high, and when seen from eastward appears bold and black, but from northward or southward it is pyramidal. Pyramid rock, southward of and connected to the point by a drying reef, is about 60 feet (18^m3) high and is surmounted by a conical building 20 feet (6^m1) in height. Rocks above water and sunken rocks extend about 6 cables eastward and south-eastward from Ta-tso chiao (*Lat.* $24^\circ 53' N.$, *Long.* $118^\circ 59' E.$). 45

During the north-east monsoon small vessels with local knowledge can obtain anchorage in a small bay immediately westward of Pyramid rock; this anchorage is protected eastward by the reef extending south-eastward from Ta-tso chiao, which forms a good breakwater. Rocks lie within a distance of about 3 cables around a point situated about $1\frac{1}{2}$ miles westward of Pyramid rock.

Charts 1968, 2412, 1262, 1263.

Chart 1760, 1761.

Hsiao-tso chiang.—**Caution.**—Hsiao-tso chiang (Port Matheson), entered between Ta-tso chiao and Hsiao-tso chiao (Gulai point), situated about 4 miles north-north-eastward, affords good shelter to
 5 small vessels with local knowledge with offshore winds. A group of islets, with several rocks around, lies in the southern part of the bay, just within the entrance; the largest of these islets is about 120 feet (36^m6) high. There is another group of islets just within the entrance on the northern side of the bay, the westernmost islet
 10 being about 70 feet (21^m3) high. Owing to the number of rocks lying off the shores of the bay, and the possibility of the existence of uncharted dangers, caution should be exercised by vessels proceeding into the bay.

Sugarloaf hill, the highest hill on the northern side of the bay,
 15 is brown, conical, and prominent from eastward of Ta-tso chiao, being the only hill of this shape in the vicinity.

Mei-chou wan.—**Islets and dangers.**—**Anchorage.**—Mei-chou wan (Meichen sound) is entered between a point situated about 1½ miles north-eastward of Hsiao-tso chiao and Rogues point (*Lat.* 25° 02' N.,
 20 *Long.* 119° 07' E.), lying about 6 miles north-eastward; Rogues point is the southern extremity of Mei-chou tao (Meichen island). The sound, which has a very irregular coastline, runs north-north-westward for about 18 miles, and has only been partially examined, so that many uncharted dangers may exist in it.

25 On the western side of the entrance, between Hsiao-tso chiao and a point lying about 5½ miles northward, the coast recedes and forms a bay in which there are a number of islets and rocks; the largest islet, Huang-kan hsü, is near the northern point.

A reef extends about one cable south-eastward from Rogues point.
 30 A 5-fathom (9^m1) patch lies about 1½ miles south-eastward of Rogues point, and a 4½-fathom (8^m7) patch lies about the same distance southward of the point. Mei-chou tao is connected to the coast northward by a flat with general depths of less than 3 fathoms (5^m5) over it.

Scout rock lies about 1½ miles westward of Rogues point. A large
 35 reef lies about 2½ miles westward of Rogues point; on the southern end of this reef is Square rock, one of a group of rocks above water, and near the northern end is Ninepin rock. A group of flat rocks, which dry 17 feet (5^m2), lies about 6 cables eastward, and a rock, which dries, lies about one mile north-north-eastward of Ninepin rock.

40 *Chart 1761.*

Ta-te hsü (Saddle island), 277 feet (84^m4) high, situated about 3 miles north-westward of Ninepin rock, is surrounded by rocks and islets except on its northern side; an islet lies about one mile westward of Ta-te hsü, and shoal water extends to it from a point
 45 on the mainland about 4 miles west-north-westward. A pinnacle rock, with a depth of 6 feet (1^m8) over it, lies near mid-channel between Ta-te hsü and the point at the northern end of the bay on the western side of the entrance, which lies about 2 miles south-westward. Some rocks above water and a sunken rock lie about 1½
 50 miles eastward of Ta-te hsü.

Cliff islet lies about one mile north-north-eastward of Ta-te hsü, and there is a rock awash about midway between. Shoal water extends for about one mile westward of Cliff islet, and a large sandbank lies north-westward of this islet; a rock, with a depth of less than

Charts 1968, 2412, 1262, 1263.

Chart 1761.

6 feet (1^m8) over it, lies about 1½ miles south-westward of the western extremity of Cliff islet (*Lat. 25° 06' N., Long. 119° 03' E.*). Mound peak is situated on the mainland and about one mile northward of Cliff islet ; a walled town, with a pagoda near it, is situated close westward of Mound peak. 5

Charts 1760, 1761.

In the north-east monsoon good anchorage can be obtained by vessels with local knowledge between Rogues point and the flat rocks lying about 6 cables eastward of Ninepin rock, taking care to avoid Scout rock ; there is also anchorage, in a depth of about 8 fathoms (14^m6), with Ninepin rock bearing 180°, and Rogues point bearing 126°. 10

Chart 1761.

In the south-west monsoon good anchorage can be obtained, by vessels with local knowledge, north-westward of Ta-te hsü. 15

Coast.—Dangers.—Anchorage.—Shot point is the north-eastern extremity of Mei-chou tao ; rocks above water and sunken rocks lie within a distance of one mile from it. Rowan islands lie close off a point on the mainland situated about one mile northward of Shot point. 20

Ping-hai wan (bay) is entered between Rowan islands and Ping point, lying about 6½ miles north-eastward. Ping rock, 90 feet (27^m4) high and conical, lies about 4 cables southward of Ping point ; a rock, awash, lies about a quarter of a mile south-westward of Ping rock, and two rocks, which dry one foot (0^m3), lie about three-quarters of a cable and 1½ cables, respectively, west-north-westward of Ping point. The town of P'ing-hai is situated close northward of Ping point. About 4 miles westward of Ping point is a high range of hills with a prominent peak named Ying-feng shan (Marlin Spike) ; the portion of the bay within this range is shoal. 30

There is anchorage during the north-east monsoon, for vessels with local knowledge, in depths of from 3 to 5 fathoms (5^m5 to 9^m1), off P'ing-hai town, but the holding ground is not good, and with strong winds vessels often drag their anchors. 35

The coast between Ping point and Fort Hill point, situated about 8 miles north-eastward, is fringed with rocks, and rocks and foul ground lie in the middle of the entrance to the bay between these two points, which has depths of less than 3 fathoms (5^m5) in it. 40

Charts 1760, 1761.

Off-lying islands and dangers.—Tidal streams.—Caution.—Ta-tien or Sorrel rock, situated about 3½ miles eastward of Rogues point, is 60 feet (18^m3) high ; a detached rock lies nearly one cable southward of Ta-tien, and a shoal extends about 4 cables north-eastward. 40

Wu-ch'iu hsü (Ockseu islands) consists of two islands lying about 18 miles eastward of Rogues point. The north-western island is 237 feet (72^m2) high and has a round summit with smooth sides ; there is a large fishing village on its south-western side. The south-eastern island, named Hsia hsü, has sandy hummocks, and there is a small fishing village on it ; detached rocks lie off its southern side. See view facing page 139. 50

In clear weather, power vessels proceeding against the north-east monsoon usually pass Wu-ch'iu hsü about 2½ miles north-westward of the north-western island (*Lat. 25° 00' N., Long. 119° 27' E.*).

Charts 1968, 2412, 1262, 1263.

Chart 1761.

Between Wu-ch'iu hsü and Niu shan (Turnabout island), described in page 160, the tidal streams set eastward and westward, with a maximum rate of 3 knots; the direction is, however, greatly influenced by the wind.

Lu-tz'u hsü (Loutz island) lies about $5\frac{1}{2}$ miles south-eastward of Ping point; in 1903 the s.s. *Ness* reported a rock, awash, about half a mile westward of this island, but its position is doubtful. In 1904, the s.s. *Tilania* drawing 17 feet (5^m2), reported grounding on a shoal about $1\frac{1}{2}$ miles southward of Lu-tz'u hsü. Loutz shoal, consisting of two sunken rocks about a quarter of a mile apart, lies about $1\frac{1}{2}$ miles west-north-westward of Lu-tz'u hsü. Loutz rock, with a peaked summit about 20 feet (6^m1) high, lies about $1\frac{1}{2}$ miles north-eastward of Lu-tz'u hsü; a rock, which uncovers at half tide, lies about 2 cables north-north-westward of Loutz rock, and a similar rock lies about 8 cables southward of Loutz rock. Caution must be exercised in this vicinity, as other dangers may exist.

Charts 1760, 1761.

Light.—A light is exhibited, at an elevation of 286 feet (87^m2), from a black circular tower, 64 feet (19^m5) in height, situated on the summit of the north-western island of Wu-ch'iu hsü; the keeper's dwelling is white.

Chart 1761.

HSING-HUA WAN AND APPROACHES.—**General remarks.**—The entrance to Hsing-hua wan (Hunghwa sound), situated between Fort Hill point and a point about $8\frac{1}{2}$ miles north-eastward, is fronted by an archipelago known as I-t'u ch'ün-tao (Eighteen Yits). The only serviceable channels for entering the sound are Nan-jih shui-tao (Lam Yit channel), along the western side of the archipelago, and Hsing-hua shui-tai (Hunghwa channel), along the north-eastern side. See view facing page 139.

Nan-jih tao.—**Dangers south-westward.**—Nan-jih tao (Lam Yit), the largest island of I-t'u ch'ün-tao, lies with Lam point, its north-western extremity, about 4 miles south-eastward of Fort Hill point. The south-eastern extremity of the island is a bold table-land, 530 feet (161^m5) high; Ta-ch'iao shan (High cone), the highest peak on the island, is 565 feet (172^m2) high and rises on a peninsula forming the eastern extremity, and Low cone is situated in the north-western part of the island.

South Yit is an islet connected to the southern extremity of Nan-jih tao by a reef, which dries. A rock, awash, lies half a mile eastward of South Yit; a flat rock, above water, lies about 2 miles north-westward of South Yit and about a quarter of a mile off the south-western coast of Nan-jih tao, and about 4 cables southward of this rock is a rock, awash. Duke reef (*Lat. $25^{\circ} 10' N.$, Long. $119^{\circ} 29' E.$*) lies about 2 miles west-north-westward of South Yit, and dries about 23 feet (7^m0); if there is any sea it breaks on the reef at low water. A large sandbank, with its southern extremity about 2 miles westward of Duke reef, lies southward of the south-western point of Nan-jih tao; this sandbank is subject to change, but it is marked by discoloured water. A $4\frac{1}{2}$ -fathom (8^m2) patch lies about $2\frac{1}{2}$ miles-southward of the south-western point of Nan-jih tao.

Nan-jih shui-tao.—**Islets and dangers.**—**Anchorage.**—**Directions.**—

Charts 1968, 2412, 1262, 1263.

Chart 1761.

Nan-jih shui-tao or Lam Yit channel, entered from southward between Loutz rock and the sandbank lying southward of the south-western point of Nan-jih tao, is bounded westward by the bank, with depths of less than 5 fathoms (9^m1) over it, extending from the mainland between Ping point and Fort Hill point, and eastward by the western side of Nan-jih tao. 5

Clam islet lies on the western side of the northern entrance and about 2 miles north-westward of Lam point; Haystack, and several other rocks, lies close westward of the islet. A rock, with a depth of about 6 feet (1^m8) over it, lies about 1½ miles west-south-westward of Clam islet. A rocky patch, with a least depth of 1½ fathoms (3^m2) over it, lies nearly 2 miles south-south-westward of Clam islet; in 1928, shoal water was reported to extend about half a mile southward of this patch. Middle islet, with a rock awash close southward of it, lies about 1½ miles northward of Clam islet. 15

Sheltered anchorage can be obtained by vessels with local knowledge southward of Lam point, and as close to the point as the vessel's draught will permit; owing to the bad holding ground, rock covered with mud, this anchorage is, however, unsafe with strong north-easterly winds. The outer rock off Lam point always shows, and this rock must not be brought to bear more than 339°, as the depths in the bay southward of Lam point decrease suddenly, and a sunken rock lies about 6 cables south-south-eastward of the point. Anchorage can also be obtained, in depths of from 4 to 5 fathoms (7^m3 to 9^m1), about 1½ miles northward of the point. 25

A vessel can proceed through Nan-jih shui-tao on a northerly course, passing about one mile westward of Lam point, and the same distance eastward of Clam islet (*Lat.* 25° 15' N., *Long.* 119° 24' E.) and Middle islet. 30

Chart 1935.

Hsing-hua shui-tao.—Islets and dangers.—Tidal streams.—The remainder of I-t'u ch'ün-tao, lying north-eastward and eastward of Nan-jih tao, are small islands covering a wide area encumbered by rocks, shoals, and reefs, too dangerous for navigation, whilst the tidal streams are strong; they form the south-western side of Hsing-hua shui-tao or Hinghwa (Hungghwa) channel, and only the outer islands and dangers, and those which lie near the channel are described here. 35

Ta-mai hsü (Triangle Yit), 230 feet (70^m1) high, lies about one mile south-eastward of the eastern point of Nan-jih tao; foul ground extends about one mile eastward from this islet. Fishing stakes may be found at times extending for a distance of about 4 miles south-eastward from a position about 2 miles east-south-eastward of Ta-mai hsü. 40

Hsiao-mai hsü (Stony Yit), 150 feet (45^m7) high, lies about 1½ miles northward of Ta-mai hsü; a rock lies 4 cables eastward of this islet, and shoal ground extends about half a mile north-westward from it. 45

Scattered Yits, the outermost danger on the south-western side of the channel, situated about 4½ miles east-north-eastward of Ta-mai hsü, consist of three rocks, the south-western being 3 feet (0^m9) high; in 1937 a rock, which dries, was reported to lie about 1½ cables southward of the latter rock. 50

Tung-sha hsü (Cap Yit), 225 feet (68^m6) high, lies about 1½ miles west-north-westward of Scattered Yits; a rock, which dries 6 feet

Charts 1968, 2412, 1262, 1263.

Chart 1985.

(1^m8), lies about 6 cables eastward of Tung-sha hsü, with other rocks between.

Tung-yüeh hsü (Double Yit) consists of three islets, the south-western
 5 and highest of which is 105 feet (32^m0) high and lies about 1½ miles
 north-eastward of Tung-sha hsü ; a rock, with a depth of about 7 feet
 over it (2^m1), was reported, in 1909, to lie about 6 cables east-north-
 eastward of the south-eastern of these islets. Ch'ih-shan hsü (Long
 Yit), an islet lying about 1½ miles westward of Tung-yüeh hsü, is 173
 10 feet (52^m7) high and steep-to at its eastern end. Hong Kong rock,
 situated about three-quarters of a mile north-eastward of Ch'ih-shan
 hsü, has depths of less than 6 feet (1^m8) over it and is not marked by
 discolouration. North-east Yit, lying about 1½ miles north-westward
 of Ch'ih-shan hsü, is about 10 feet (3^m0) high, and shoal water
 15 extends about one cable north-westward from it.

Chart 818.

Hsiao-jih yen or Little Yit lies nearly 1½ miles westward of North-
 east Yit and is about 20 feet (6^m1) high ; there are several patches,
 with depths of from 4½ to 5½ fathoms (8^m2 to 10^m1) over them,
 20 between this rock and North-east Yit.

Chart 1985.

Sheng-t'u-li tao (Sedan rock), the outermost danger on the north-
 eastern side of the channel, situated about 5 miles east-north-east-
 ward of Scattered Yits, has a depth of 1½ fathoms (3^m2) over it
 25 and is steep-to. At Sheng-t'u-li tao (*Lat.* 25° 15' N., *Long.* 119° 45'
E.), the tidal streams set south-westward during the rising tide, and
 south-eastward during the falling tide, with a maximum rate of about
 2½ knots.

Tung-chia (Reef island), 192 feet (58^m5) high, lies with its southern
 30 extremity about 2½ miles northward of Sheng-t'u-li tao, with Comet
 rock, having a depth of 6 feet (1^m8) over it, and Breaker rock, which
 dries 9 feet (2^m7), between ; there is foul ground for about 3 cables
 northward of Breaker rock. A reef, with above water and sunken
 rocks on it, extends about 7 cables northward of Tung-chia ; at the
 35 northern end of this reef is Long reef, which has a rock 4 feet (1^m2)
 high on it. Off the eastern point of Tung-chia, and connected to it
 by a reef, which dries, is an islet 101 feet (30^m8) high ; Hsiao hsü,
 and some above water and sunken rocks, lie within half a mile south-
 eastward of the same island. Cheng hsü (Bent islet), 165 feet (50^m3)
 40 high, lies about half a mile westward of Tung-chia, with shoals and
 drying reefs between ; foul ground, with some rocks above water,
 extends about three-quarters of a mile south-westward from Cheng
 hsü. Hsiao-peih-heng hsü (Sentry island) 138 feet (42^m1) high, lying
 nearly 1½ miles south-westward of Cheng hsü, appears as two small
 45 islets when seen from south-eastward. A rock, with a depth of 3
 fathoms (5^m5) over it, lies about one mile westward of the south-
 western end of Hsiao-peih-heng hsü.

Chung-lou shan (Sand island), 289 feet (88^m1) high, lies with its
 southern extremity about 2½ miles north-westward of Hsiao-peih-heng
 50 hsü, and is of a whitish colour, with sandy beaches and isolated hills.
 Rocks extend about three-quarters of a mile from the south-eastern
 side of the island, and a large patch of foul ground, with some rocks
 above water, lies about midway between this island and Hsiao-peih-
 heng hsü ; a rock, with a depth of less than 6 feet (1^m8) over it, lies

Charts 1761, 1968, 2412, 1262, 1263.

Chart 1985.

about 9 cables east-south-eastward of the southern point of Chung-lou shan, and, in 1929, a wreck, with the masts and funnel above water, lay on this rock. Shoal water, with depths of less than 5 fathoms (9^m1), extends fully 1½ miles westward from Chung-lou shan. 5

Volga rock, with a least depth of 4 feet (1^m2) over it, lies about 3 miles west-north-westward of the southern end of Chung-lou shan; the tidal streams and rippings are very strong near this rock. Douglas islet, 50 feet (15^m2) high, lies about 6 cables northward of Volga rock and about the same distance southward of Vangan point, on the mainland, and is surrounded by a shoal, with depths of less than 3 fathoms (5^m5) over it, extending about 3 cables from its south-western side. Punchard islet, 64 feet (19^m5) high, with an islet close south-westward of it, lies nearly one mile west-north-westward of Douglas islet and nearly 2 cables offshore. Ch'ih hsü (Kerr island), 131 feet (40^m9) high, lies about 1½ miles westward of Douglas islet and on the north-western part of a large reef; South Kerr islet, 54 feet (16^m5) high, lies about 3 cables south-eastward of Ch'ih hsü. A reef, with a least depth of 3 fathoms (5^m5) over it, lies about 7 cables south-eastward of South Kerr islet, and a rock, which dries 8 feet (2^m4), lies about 3½ cables south-south-westward of this islet; a shoal, with a least depth of 7 fathoms (12^m8) over it, lies nearly 1½ miles southward of South Kerr islet, and another, with a depth of 5 fathoms (9^m1) over it, lies 8 cables west-south-westward of the same islet. 20

Chart 818.

Pai-t'ou hsü (White islet), 130 feet (39^m6) high, situated about 2 miles west-south-westward of Ch'ih hsü, is bare. Hung yen (rocks) lies about one mile southward of Pai-t'ou hsü (*Lat.* 25° 19' N., *Long.* 119° 33' E.); on the eastern part is a rock which dries 8 feet (2^m4), and on the western part is a rock which dries 4 feet (1^m2). 30 The summit of Ts'ao hsü (Chim island) (page 149) in line with South Kerr islet (chart 1985), bearing 068°, leads northward of Hung yen, and Ch'iao-yai hsü (Cliff islet) (page 147) bearing 266°, and open northward of Hsiao-jih tao (*see below*), leads southward of these rocks.

Hsiao-jih tao or Red Yit, an island rising to an elevation of 324 feet (98^m8) in the northern part, lies on the southern side of the channel with its northern extremity about 3 miles south-westward of Pai-t'ou hsü; the area southward of the line joining the northern point of Hsiao-jih tao and Hsiao-jih yen is foul. Pei-jih yen or North Yit lies about three-quarters of a mile north-westward of the northern point of Hsiao-jih tao; a rock in the western part dries 13 feet (4^m0), and two rocks in the eastern part dry 2 feet (0^m6) and 4 feet (1^m2), respectively. 40

Ta-she hsü or Passage islands consists of a group of three islands, the largest and western of which is 97 feet (29^m6) high, which are surrounded by numerous above water and sunken rocks, and lie north-westward of Hsiao-jih tao; Kao-fu hsü (Gough islet), 95 feet (29^m0) high, the northernmost of the group, lies nearly 4 miles westward of Pai-t'ou hsü, and is conical, cliffy, and steep-to on its northern side. A rock, one foot (0^m3) high, lies about three-quarters of a mile south-eastward of Kao-fu hsü; depths of less than 3 fathoms (5^m5), extend about 4 cables eastward and a quarter of a mile westward from this rock. A reef, which dries 13 feet (4^m0) at its outer end, extends about 2 cables westward of the western island 50

Charts 1761, 1968, 2412, 1262, 1263.

Chart 818.

of Ta-she hsü. A shoal, with depths of 6 fathoms (11^m0) over it, lies about three-quarters of a mile west-south-westward of the western island of Ta-she hsü.

- 5 Huang yen (Douglas rock) and the other dangers southward of Ta-she hsü are described on page 147.

Lu hsü (Wilshire island), 86 feet (26^m2) high, lies nearly 6 cables north-westward of Kao-fu shü; a rock, 3 feet (0^m9) high, lies about one cable southward of the island, and about one cable north-west-
10 ward of this rock is a rock which dries 13 feet (4^m0). A rock, which dries 12 feet (3^m7), lies about 2 cables north-eastward of the north-eastern point of Lu hsü (*Lat.* 25° 20' N., *Long.* 119° 29' E.).

Yeh-ma hsü (Rugged island), 350 feet (106^m7) high, lies about 4 cables northward of Lu hsü. Ko-fei tao (Griffith island) lies about 4
15 cables off the north-western coast of Yeh-ma hsü; a rock, with a depth of less than 6 feet (1^m8), lies about 4 cables west-north-westward of the south-western point of Yeh-ma hsü.

Chart 1985.

Anchorage.—During the north-east monsoon, there is good
20 anchorage about midway between Kerr island and Douglas islet, in a depth of 5 fathoms (9^m1), with Punchard islet bearing 351°, distant 6 cables, but the bottom is very uneven in this locality.

Chart 818.

Anchorage may be obtained about 2 cables westward of Lu hsü,
25 in a depth of 12 fathoms (21^m9), mud, out of the strength of the tidal streams. In 1936 H.M.S. *Dorsetshire* anchored with the western extremity of Lu hsü bearing 081°, distant 7 cables, in a depth of 14 fathoms (25^m6); the bottom here is, however, uneven, and the tidal streams are strong.

30 Charts 818, 1985.

Tidal streams.—A portion of the north-westerly tidal stream, entering the South-east entrance to Hai-t'an hsai (strait) (page 149) during the rising tide, turns south-westward round Ts'ao hsü (page 149); this portion divides southward of Volga rock, one
35 part flowing southward, and the other part flowing through the numerous passages between Yeh-ma hsü and Nan-jih tao to Nan-jih shui-tao.

The west-going stream in the channels between Yeh-ma hsü and Hsiao-jih tao may attain a rate of from 5 to 7 knots at spring tides,
40 setting fairly through the passages; there are frequently heavy overfalls and eddies. In March, an eddy has been experienced between Hsiao-jih tao and Pei-jih yen, setting north-eastward and south-westward, with a maximum rate of from 2 to 3 knots.

Directions.—A vessel should enter Hsing-hua shui-tao from
45 eastward by passing between Sheng-t'u-li tao (*Lat.* 25° 15' N., *Long.* 119° 45' E.) and Scattered Yits; thence she should pass between Hsiao-pei-heng hsü and the rock reported to lie about 6 cables east-north-eastward of Tung-yüeh hsü, taking care to avoid the 3-fathom (5^m5) rock lying about one mile westward of Hsiao-pei-heng hsü. The
50 route then lies between Hong Kong rock, North-east Yit and Hsiao-jih yen, on the southern side, and Volga rock and South Kerr islet, with the adjacent dangers, on the northern side; Pai-t'ou hsü kept midway between Lu hsü and Yeh-ma hsü, bearing 280°, leads clear southward of all the dangers lying near South Kerr islet. A vessel can

Charts 818, 1985.

pass either side of Pai-t'ou hsü, and thence between Kao-fu tao and the 3-foot (0^m9) high rock off the southern side of Lu hsü, taking care to give this rock a good berth.

Charts 818, 1761.

A vessel proceeding from Nan-jih shui-tao into Hsing-hua shui tao, after passing one mile eastward of Clam and Middle islets (page 143), should steer for the western end of Yeh-ma hsü; when Kao-fu tao bears 090° an easterly course can be steered to pass between this islet and the 3-foot (0^m9) high rock southward of Lu hsü.

Chart 818.

Inner passage between Nan-jih shui-tao and Hsing-hua shui-tao.—

Islands and dangers.—Directions.—The ordinary routes taken by vessels proceeding through either Nan-jih shui-tao or Hsing-hua shui-tao unite at the entrance to Hsing-hua wan; these two channels are also connected by a channel leading southward of Ta-she hsü (page 145). Owing to the numerous dangers in this channel, and the lack of leading marks to avoid them, it must only be used in cases of emergency by small vessels.

Ch'iao-yai hsü (Cliff islet) 97 feet (29^m6) high, and lying about 3 miles westward of the northern extremity of Hsiao-jih tao, is precipitous. A bank, with general depths of from 3½ to 5 fathoms (6^m4 to 9^m1) over it, lies with its eastern edge about 3 cables westward of Ch'iao-yai hsü; on the south-western edge of this bank and about 8½ cables westward of the islet, there is a depth of only 2½ fathoms (4^m6). A shoal with depths of less than 5 fathoms (9^m1) over it, extends about half a mile eastward from Ch'iao-yai hsü; on it are two reefs which dry 9 and 12 feet (2^m7 and 3^m7), respectively. A reef, which dries 13 and 15 feet (4^m0 and 4^m6) in places, lies from 2 to 4 cables north-eastward of Ch'iao-yai hsü.

Huang yen (Douglas rock), a small pinnacle with a depth of 4 feet (1^m2) over it, lies about 6½ cables south-south-eastward of the eastern island of Ta-she hsü; a 2-fathom (3^m7) patch lies about one cable south-eastward of Huang yen, and a rock, with a depth of less than 6 feet (1^m8) over it, lies nearly 2 cables southward of the rock. These three heads lie on a rocky shoal, with depths of from 2½ to 5 fathoms (5^m0 to 9^m1) over it, which extends about 4 cables southward and south-westward from Huang yen; three 4-fathom (7^m3) patches lie close off the western and north-western sides of this shoal.

A reef, part of which dries 13 feet (4^m0), lies nearly half a mile southward of Huang yen (*Lat. 25° 18' N., Long. 119° 29' E.*).

A vessel proceeding through this channel from westward should pass about 1½ cables westward of Ch'iao-yai hsü by keeping the summit of Ko-fei tao in line with the south-western point of Yeh-ma hsü bearing 358°. Continue thus until the north-western side of Kao-fu hsü is in line with the south-eastern side of the western island of Ta-she hsü, bearing 036°, when steer for them on this bearing; when the western sides of Lu hsü and the western island of Ta-she hsü are in line, bearing 007°, steer eastward to pass midway between Huang yen and the one-foot (0^m3) high rock lying about 3½ cables north-north-eastward.

Chart 1761.

Hsing-hua wan.—Islands and dangers.—Beacon.—Anchorage.—Hsing-hua wan (Hunghwa sound) contains many islets and dangers,

Charts 1968, 2412, 1262, 1263.

Chart 1761.

and it has not been thoroughly examined; Hsing-hua chiang (Hunghwa river), leading to the town of P'u-tien, discharges into its north-western corner.

- 5 La-ku-te tao (Knob islet), with some rocks northward and north-westward of it, lies about 3 miles north-north-westward of Middle islet (page 143). Two larger islets lie westward of La-ku-te tao; the western one is named Huang-kang hsü.

- 10 The Brothers, two islands on the south-western side of the sound, lie about $6\frac{1}{2}$ miles west-north-westward of La-ku-te tao. A pyramidal stone beacon stands about $1\frac{1}{2}$ miles south-eastward of the eastern Brother.

Pirate bay is a deep indentation on the south-western side of the sound opposite The Brothers.

- 15 Pagoda islet lies in the entrance to Hsing-hua chiang about 5 miles west-north-westward of the western Brother.

A high conical peak and a double peak, both conspicuous, are situated on the mainland about $9\frac{1}{4}$ miles west-south-westward and $4\frac{1}{4}$ miles southward, respectively, of Pagoda islet.

- 20 A vessel of moderate draught and having a length of not more than about 250 feet (76^m2) can, with local knowledge, proceed, at high water, up Hsing-hua chiang as far as the village of San-chiang-k'ou (Hunghwa), near the entrance; owing to the restricted swinging room, the vessel should moor abreast of the village. A pilot is
25 available.

Pitiu point is the southern extremity of Chiang-yin tao, a large island occupying the northern part of the sound. Chiao-chui tao (Pyramid island) (chart 818), 50 feet (15^m2) high, and Isthmus island, are situated on the north-eastern side of the sound, about 9 miles east-south-
30 eastward and 5 miles eastward, respectively, of Pitiu point.

- Hsing-hua wan affords anchorage in a typhoon. There is good anchorage, for vessels with local knowledge, in a depth of 5 fathoms (9^m1), with Pitiu point bearing 066° ; this anchorage can be approached by steering north-westward for Pitiu point from a
35 position about $1\frac{1}{2}$ miles eastward of La-ku-te tao, passing north-eastward of the rocks lying north-westward of that islet. A rock, on which the s.s. *Ichang* struck in 1931, is reported to lie about three-quarters of a mile southward of Pitiu point.

Chart 1985.

- 40 **HAI-T'AN HSIA.**—General remarks.—Hai-t'an tao (island) is separated from the main coast between Vangan point and Rodd head or Sung-hsia-chia (*Lat.* $25^\circ 42' N.$, *Long.* $119^\circ 36' E.$), situated about 21 miles northward, by Hai-t'an hsia (strait); although this strait is nearly $1\frac{1}{2}$ miles wide at its narrowest part, it is much en-
45 cumbered by islets, rocks, and shoals, leaving only narrow passages between. The southern entrance affords anchorage in a typhoon.

- Vessels exceeding 22 feet (6^m7) in draught should not use Hai-t'an hsia, as should any unforeseen delay occur to prevent them taking advantage of the rise of the tide, they would probably ground. In
50 Wilson channel, situated on the western side of the middle part of the strait, the bottom is sandy, the tidal streams are strong, and small knolls are liable to form and shift; a vessel should, therefore, have about 6 feet (1^m8) clearance under her.

Charts 1968, 2412, 1262, 1263.

Chart 1985.

Two entrances give access to the strait from southward, namely South entrance and South-east entrance; they are separated from each other by Chung-lou shan (page 144) and Ts'ao hsü (Chim island), described below.

South entrance.—Islands and dangers.—The approach to South entrance lies between Tung-yüeh hsü and Hsiao-pei-heng hsü; further northward this entrance is bounded westward by Volga rock, Douglas islet, and the coast of the mainland northward of Vangan point; and eastward by the shoals extending westward from Chung-lou shan and Ts'ao hsü. Most of these islands and dangers have already been described with Hsing-hua shui-tao, on page 143. See view B on chart 1985.

Nopass, a rock 15 feet (4^m6) high, lies on the western side of the entrance and about 6 cables eastward of Vangan point; the channel between this rock and the mainland should not be used. Nearly 2 miles north-eastward of Vangan point is a point, 116 feet (35^m4) high with a pagoda on it; Wan-an (Vangan), a walled village, lies close southward of this point. Between this point and a point lying about one mile northward is an inlet, almost entirely filled by a shoal flat; an islet, 69 feet (21^m0) high, and a larger island with a fort on its eastern extremity, lie in the entrance to this inlet. Wang-ma hsü (Hive island), 199 feet (60^m7) high, lies about 6 cables north-north-eastward of the northern entrance point of the inlet; rocks extend about 3 cables southward from this island, and a rock, 60 feet (18^m3) high, lies about one cable northward of the northern side of the island.

A group of rocks, above and below water, lie on the eastern side of the entrance, about 1½ miles north-westward of the southern extremity of Chung-lou shan.

Round islet, 142 feet (43^m3) high, and Knob islet 190 feet (57^m9) high, lie on the shoal extending from the north-western side of Chung-lou shan; a rock 8 feet (2^m4) high, with some sunken rocks around, lies about 3 cables south-westward of Round islet (*Lat.* 25° 20' N., *Long.* 119° 41' E.). Ts'ao hsü (Chim island), situated close northward of Chung-lou shan, is the highest island in this locality, and gradually rises on all sides to two peaks, on the higher of which, 769 feet (234^m4) high, three chimneys are shown on the chart, but in 1937 it was reported that these could not be identified. There are five islets, including Knob islet, in the channel between Chung-lou shan and Ts'ao hsü; the easternmost islet, which is 174 feet (53^m0) high, is connected to the southern coast of Ts'ao hsü by a ridge of rocks, and a reef, which dries about 18 feet (5^m5), lies about a quarter of a mile north-eastward of this islet.

South-east entrance.—Island and dangers.—Tung-chia, with the dangers surrounding it, has been described on page 144.

Chim rock, 42 feet (12^m8) high, lies nearly 2 miles northward of Tung-chia. North Chim rock, 18 feet (5^m5) high, lies about three-quarters of a mile northward of Chim rock; a rock lies about one cable north-eastward of North Chim rock.

South reef, situated on the northern side of South-east entrance and about 4 miles north-eastward of North Chim rock, dries 13 feet (4^m0), and the sea breaks heavily on it. Pai-chiang hsü (Trite island), 90 feet (27^m4) high, situated about 2½ miles northward of South reef, has three peaks; some islets and rocks lie within a distance of 3 cables

Chart 1985.

off its north-western side. A shoal, with a depth of $2\frac{1}{2}$ fathoms (4^m6) or less over it, was reported by the s.s. *Peiyang*, in 1895, to lie about one mile south-eastward of Pai-chiang hsü.

- 5 Hai-t'an chiao (point), situated about 3 miles northward of North Chim rock, is the south-eastern point of a rugged sandy headland forming the southern extremity of Hai-t'an tao. The south-western coast of Hai-t'an tao, which forms the north-eastern side of South-east entrance, is fringed by a wide shoal on which are several above
10 water and sunken rocks; one of these, named Square rock (*Lat.* $25^{\circ} 24' N.$, *Long.* $119^{\circ} 44' E.$), lies about $1\frac{1}{2}$ miles westward of Hai-t'an chiao and is 18 feet (5^m5) high. See view A on chart 1985.
Chart 817.

The Narrows.—Islets and dangers.—Beacons.—Northward of Ts'ao

- 15 hsü, at the junction of South and South-east entrances, the two sides of the strait converge rapidly, so that the narrowest part of the strait commences about $2\frac{1}{2}$ miles northward of Tung-ching shan (Mount Burnie), situated on the western side of the strait and about $2\frac{1}{4}$ miles north-westward of Wang-ma hsü, is 1,326 feet (404^m2) high, and prominent. Ta-niang (Tyne-yung) shan, situated about $2\frac{1}{2}$ miles
20 northward of Tung-ching shan, is a remarkable steep hill, 962 feet (293^m2) high; Quoin hill, situated about 6 cables eastward of Ta-niang shan, appears wedge-shaped when seen from northward or southward, and is 330 feet (100^m6) high. See view A on chart 1985.
25 Northward of Wang-ma hsü depths of 3 fathoms (5^m5) and under extend fully $1\frac{1}{2}$ miles off the western shore of the strait. K'o-men tao (Ko-mor) is an island, 237 feet (72^m2) high, lying close off the western side of the strait, with its southern point about half a mile northward of Wang-ma hsü; Tung-cheng hsü (Young island), 172
30 feet (52^m4) high, lies about 3 cables eastward of K'o-men tao, and close eastward of Tung-cheng hsü is an islet 30 feet (9^m1) high.

- Station island, 59 feet (18^m0) high, situated on the eastern side of the strait and about 2 miles north-westward of Square rock (chart 1985), is often difficult to identify until close to, but about three-
35 quarters of a mile northward of it, on the coast of Hai-t'an tao, there is a well defined white triangular patch of sand. Owing to its sloping sides, and the great rise and fall of the tide, Station island appears nearly twice the size at low water to what it does at high water. A reef, which dries 20 feet (6^m1), lies about 2 cables southward of
40 Station island. Edmond reef lies about 4 cables north-westward of Station island, and dries 15 feet (4^m6). A sand spit, which dries, extends about $1\frac{1}{4}$ miles north-westward from the coast eastward of Edmond reef.

- Between a point situated about three-quarters of a mile northward
45 of Edmond reef and a point lying about $2\frac{1}{2}$ miles further north-north-westward, there is a large indentation about 3 miles deep. This indentation is divided by two large islands, and its northern part is named Dyantau bay; it is almost entirely occupied by shoal flats, on which there are several islets. Gull islet, 50 feet (15^m2) high,
50 lies about three-quarters of a mile northward of the southern entrance point, and Junksail islet, 35 feet (10^m7) high, is the southern and larger of 2 islets lying about one mile westward of the same point, on the northern side of the southern entrance to the inlet. Junksail, a rock 39 feet (11^m9) high, lies close off the south-eastern side of

Charts 1761, 1968, 2412, 1262, 1263.

Chart 817.

Junksail islet. Abbott island, 93 feet (28^m3) high, lies about $1\frac{1}{2}$ miles north-north-westward of Junksail islet, on the southern side of the entrance to Dyantau bay. Keensangah is an islet situated about three-quarters of a mile east-north-eastward of Abbott island 5
(*Lat.* $25^{\circ} 28' N.$, *Long.* $119^{\circ} 41' E.$).

Low islet, 33 feet (10^m1) high, lies about 3 cables westward of Abbott island, and a rocky ledge extends $1\frac{1}{2}$ cables southward from it. There are depths of 3 fathoms (5^m5) and under on the eastern side of the narrows a short distance outside the line joining the 10
western sides of Junksail and Low islets.

Pass island, 128 feet (39^m0) high, on the western side of the fairway of the strait, lies with its northern point about $6\frac{1}{2}$ cables south-westward of Low islet; Little Pass island lies close off the north-western side of Pass island, and the two are joined together by a narrow ridge 15
of boulders and gravel. Both islands lie on a sandbank, a part of which dries 3 feet (0^m9).

There are two pyramidal concrete beacons on the eastern side of Pass island; the front beacon is white and the rear beacon is black, and in line they bear 159° . Drying patches extend about $3\frac{1}{2}$ cables 20
westward from Pass island, and obstruct the passage westward of the island.

Pass rocks lie about 2 cables eastward of the northern end of Pass island and dry 20 feet (6^m1); there is a deep channel between these rocks and Pass island, but it is not recommended. An iron tripod 25
beacon, surmounted by a sphere 6 feet (1^m8) in diameter, the whole painted black, stands near the northern extremity of Pass rocks; the total height of the structure is 26 feet (7^m9), and at least 12 feet (3^m7) of it is above high water.

Ashuelot rocks, situated about 3 cables northward of Pass rocks and 30
2 cables westward of Low islet, are three rocks with depths of 4 feet (1^m2), $1\frac{1}{2}$ fathoms (2^m7), and $3\frac{1}{2}$ fathoms (5^m9) over them, respectively; there are depths of 6 fathoms (11^m0) close around the rocks, and at low water they are plainly marked by overfalls. The western point of Station island in line with the north-eastern point of Junksail 35
islet, bearing 136° , leads between Pass rocks and Ashuelot rocks; see view A on chart 817.

Anchorage.—There is good anchorage, in a depth of 4 fathoms (7^m3), sand, with Station island bearing 072° , and the western side of Junksail islet (*Lat.* $25^{\circ} 26' N.$, *Long.* $119^{\circ} 41' E.$) bearing 328° . 40

Anchorage can be obtained off Maiangkun bay, situated near the northern entrance point of Dyantau bay, in a depth of 6 fathoms (11^m0), mud and sand, with the western sides of Junksail islet and Low islet in line, bearing 155° , and 6 cables from the latter.

Wilson and Blind channels.—Islets and dangers between The 45
Narrows and North entrance.—**Beacons.**—Wilson channel, situated on the western side of the middle part of Hai-t'an hsia, although narrow, is undoubtedly the best route; greater depths can be obtained by using it, and there are reliable leading marks for the fairway. Blind channel, eastward of Wilson channel, is wider and 50
deeper, but a vessel using it is obliged to cross a bar, with a depth of only $2\frac{1}{2}$ fathoms (4^m1), at the northern end. For convenience, the islands and dangers in or near both channels are described together, as the former afford good marks for vessels using either channel.

Charts 1985, 1761, 1968, 2412, 1262, 1263.

Chart 817.

Flag island, 68 feet (20^m7) high, the dividing point between the southern entrances of Wilson channel and Blind channel, lies about 1½ miles northward of Pass island; reefs extend about 3½ cables southward and 1½ cables northward from the island, and a rock, 12 feet (3^m7) high, lies close northward of the island.

Channel rock, situated about three-quarters of a mile north-north-eastward of Flag island, is 10 feet (3^m0) high; shoal water extends nearly one cable northward from it. Two groups of rocks, separated by a narrow channel with a depth of 7 fathoms (12^m8), lies about 4 cables north-north-westward of Channel rock; amongst the western group is a rock which dries 8 feet (2^m4), and amongst the eastern is a rock which dries 4 feet (1^m2). Hill island lies about 3 cables north-eastward of Channel rock and close off the western coast of Hai-t'an tao. Middle island, 61 feet (18^m6) high, is the western of three islets lying about 5½ cables northward of Hill island; the eastern islet is 86 feet (26^m2) high. A rock, 7 feet (2^m1) high, lies nearly 1½ cables northward of the eastern point of Middle island. Saxby islets are a group of islets and rocks, the largest of which, 15 feet (4^m6) high, lies about 9 cables eastward of Middle island. A white stone cairn stands on the 7-foot (2^m1) high rock close northward of Middle island; a similar beacon stands on the largest Saxby islet. These two beacons in line, bearing 084°, indicate the position where vessels, bound northward through Wilson channel, leave the leading line of Pass Island beacons.

Town point, situated about half a mile eastward of the largest Saxby islet, is the southern entrance point of a channel leading to P'ing-t'an (Hai-tan-chin) (chart 1985), a town near the eastern coast of Hai-t'an tao; on the northern side of this channel, and about 2 miles eastward of Town point, is a sandhill 171 feet (52^m1) high.

Heng chiao is the eastern extremity of a peninsula situated on the western side of the strait, about 2½ miles west-north-westward of Flag island (*Lat.* 25° 29' N., *Long.* 119° 39' E.). Rocky islands, four in number, with numerous rocks around them, lie on the western side of Wilson channel, the northern and largest, 33 feet (10^m1) high, being about 2½ miles north-westward of Flag island. Charles island, 49 feet (14^m9) high, lies nearly three-quarters of a mile northward of the northern Rocky island, and there is a large boulder on its summit. Black rocks, the highest of which is 20 feet (6^m1) high, lie about 3½ cables eastward of Charles island; there are depths of over 3 fathoms (5^m5) on the western side of Wilson channel about one cable eastward of these rocks. About one mile west-north-westward of Black rocks lies the south-eastern extremity of Ta-pan tao, a large island fronting this part of the coast; Talisman peak or Ninepin stone, 304 feet (92^m7) high, lies on the western side of this island. A sandbank, which dries in patches, extends about 1½ miles from the coast abreast of Ta-pan tao, and for about 2 miles further northward; several islets and rocks lie on the northern part of this sandbank, the principal being Ming-chiang hsü (Round island), lying about 2½ miles north-north-westward of Charles island, and Ssu hsü (St. Hilaire islets), about 3½ cables eastward of Ming-chiang hsü.

Charts 817, 1985.

Yang-chung-chai (Shearburn peak), 463 feet (141^m1) high, lies on the mainland about 1½ miles northward of Talisman peak. Between

Charts 1761, 1968, 2412, 1262, 1263.

Chart 817, 1985.

this peak and Rodd head, situated about 7 miles northward, the coast recedes and forms a vast bay, largely filled with drying flats, and with some islands across the entrance in places.

Chart 817.

Between Town point and Hsiao-yu hsü (Haye islet), 91 feet (27^{m7}) high and situated about 4 miles northward, the eastern shore of the strait is fronted by a shallow bank which dries in places up to 2 miles off-shore. A number of islets lie on this bank, including Seahseu, 56 feet (17^{m1}) high, Wanseu, 69 feet (21^{m0}) high, Hsiao-ma hsü (Batewi), 114 feet (34^{m7}) high, and Hsiao-chieh (Hope islet), 99 feet (30^{m2}) high; the positions of these can best be seen from the chart.

Tricker rock, situated about 1½ miles west-south-westward of Hsiao-yu hsü, dries 20 feet (6^{m1}); some rocks lie close off the south-eastern side of Tricker rock, and a 2-fathom (3^{m7}) patch lies about 1½ cables south-south-eastward of it. Pillar rock, 90 feet (27^{m4}) high, lies about one mile north-north-eastward of Tricker rock; close westward of Pillar rock is an islet 40 feet (12^{m2}) high.

Tong point lies on Hai-t'an tao about 1½ miles northward of Pillar rock, and Chin shan (Cleft peak), 175 feet (53^{m3}) high, lies about half a mile north-eastward of Tong point.

Tower rock, situated about 2½ miles north-westward of Pillar rock, is 28 feet (8^{m5}) high and flat, with a deep embrasure; a smaller rock lies about one cable westward of it.

Chart 1985.

North entrance.—Islands and dangers.—Beacons.—Hsu-t'ou tao (Chung island), Ku hsü (Slut island), Ch'ang hsü (Shingan island), Hsiao-lien tao (Dori island), and Ta-lien tao (Tatong island) lie across the northern entrance of Hai-t'an hsia, as well as numerous rocks and shoals; although there are deep channels between some of these, only one is in general use, namely that between Ku hsü and Ch'ang hsü.

Ta-lien tao (Tatong island) lies about half a mile off the north-western coast of Hai-t'an tao, and its summit, Wei-ying shan, 750 feet (28^{m6}) high, is in the south-eastern part. The channel between these two islands is deep, but Button (*Lat. 25° 38' N., Long. 119° 42' E.*), an islet 40 feet (12^{m2}) high, lies in about the middle, and a reef, awash, lies about half a mile south-westward of Button. The eastern approach to this channel is obstructed by Long island, 165 feet (50^{m3}) high, situated about 2 miles off Tatong point, the north-eastern extremity of Ta-lien tao, and by a number of reefs and shoals, the positions of which can best be seen from the chart. A cone-shaped hill is situated on the coast of Hai-t'an tao, about 2 miles eastward of Wei-ying shan. A bank, with depths of less than 5 fathoms (9^{m1}) over it, extends about 2 miles north-eastward from the eastern end of Ta-lien tao; a rock, which dries 20 feet (6^{m1}), lies on the south-eastern edge of this bank, which contains a considerable area with depths of from 1½ to 3 fathoms (2^{m3} to 5^{m5}), and several dangerous rocks. Gleig islets, five in number, and several shoals, lie from half a mile to 1½ miles off the northern side of Ta-lien tao; the western Gleig islet is 80 feet (24^{m4}) high. A bank, with depths of less than 2 fathoms (3^{m7}) over it, extends about 1½ miles south-westward from the south-western part of Ta-lien tao; Inner rock, lying near the outer end of this bank and fully one mile north-eastward of Tower rock, is 30 feet (9^{m1}) high. Three rocks,

Chart 1985.

situated about half a mile westward of Inner rock, are from 2 to 6 feet (0^m6 to 1^m8) high.

Hsiao-lien tao (Dori island) is separated from the north-western coast of Ta-lien tao by a channel about 3 cables wide, but it should not be used for navigation; a rock, which dries 16 feet (4^m9), lies in the southern part of this channel. A bank, with depths of less than 5 fathoms (9^m1) over it, and less than 3 fathoms (5^m5) in places, extends about 3 miles north-eastward from Hsiao-lien tao; shoals of 2½ and 2½ fathoms (4^m1 and 4^m6) lie near the eastern end of this bank and about 1½ miles north-north-westward of Tatong point. There are irregular depths, with patches of foul ground, up to a distance of about 1½ miles south-south-westward of Hsiao-lien tao, and a rock, which dries 2 feet (0^m6), lies nearly one mile south-south-westward of the south-western point of this island. About half a mile west-south-westward of the south-western point of Hsiao-lien tao is a large patch of rocky and foul ground, with some rocks on it which dry 8 feet (2^m4).

Ch'ang hsü (Shingan island) is a long narrow island separated from the north-western coast of Hsiao-lien tao by a channel about 3 cables wide, in which there are irregular depths of from 2½ to 14 fathoms (4^m1 to 25^m6). Shing rock, 90 feet (27^m4) high, lies about 6 cables north-eastward of Ch'ang hsü and is connected to it by a rocky reef. A rock, with a depth of less than 6 feet (1^m8) over it, lies about half a mile north-eastward of Shing rock; a wreck, visible at low water, lies on this rock, and there is a 3-fathom (5^m5) patch between it and Shing rock. Simpson spit extends about 2 miles northward from the northern side of Ch'ang hsü and across the main entrance leading into Hai-t'an hsia from northward; there are general depths of from 3½ to 4 fathoms (6^m9 to 7^m3) over this spit, but a 2½-fathom (4^m6) patch lies about 7 cables north-westward of Shing rock. Shoal water extends about 2 cables from the western side of Ch'ang hsü.

Ku hsü (Slut island), a small island, 170 feet (51^m8) high, lies about half a mile westward of Ch'ang hsü; the summit of Ku hsü, when seen from southward, is a boulder, painted white with a black vertical stripe, and there is a light-coloured patch on the western shoulder of the island. A bank, with a depth of 3 feet (0^m9) over it at the outer end extends about 6 cables southward from Ku hsü; a rock, with a depth of 6 feet (1^m8) over it, lies on the western edge of this bank and about 2 cables southward of the south-western point of Ku hsü (Lat. 25° 41' N., Long. 119° 37' E.). Mitre rock, lying about three-quarters of a mile southward of Ku hsü, is 20 feet (6^m1) high. On the south-eastern slope of Ku hsü are two white pyramidal concrete structures, 1½ cables apart. These beacons are in line, bearing 351°, and the painted boulder on the summit of Ku hsü, and Yü-kuo shan (Cow's Horn) (page 155) are in line bearing 352°; see view C on chart 1985. The two beacons in line lead between Mitre rock and the dangers south-eastward of it. A spit, with general depths of from 3½ to 5 fathoms (5^m9 to 9^m1) over it, extends about 1½ miles north-north-eastward from Ku hsü, but a 2-fathom (3^m7) patch lies on this spit about 4 cables north-north-eastward of the eastern point of this island. An islet lies about 1½ miles northward of Ku hsü, and within a distance of 1½ miles north-north-eastward of this islet are two drying reefs, the northernmost lying about half a mile north-westward of the north-western extremity of Simpson spit. Between these dangers

Charts 1761, 1968, 2412, 1262, 1263.

Chart 1985.

and the spit extending north-north-eastward from Slut island, there are shoals with depths of from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms over them, for the positions of which the chart should be consulted.

Hsu-t'ou tao (Chung island) is a large island, 150 feet (45^m7) high, 6 lying with its north-eastern extremity, from which rocks extend about three-quarters of a mile north-eastward, about half a mile westward of Ku hsü. There is deep water between Ku hsü and the northern end of Hsu-t'ou tao, but further southward, the latter island is fronted by extensive shoal flats. 10

Yü-kuo shan (Cow's Horn) is a remarkable peak, 1,260 feet (384^m0) high, on the mainland, situated near the coast about $3\frac{1}{2}$ miles northward of Rodd head, which lies about $1\frac{1}{2}$ miles north-westward of Ku hsü.

Mount Balfour, 1,711 feet (521^m5) high, lies about $2\frac{1}{2}$ miles west-north-westward of Yü-kuo shan (*Lat.* $25^\circ 45' N.$, *Long.* $119^\circ 36' E.$). 15

Off-lying islands and dangers.—**Caution.**—Ta-lao shan (Tessara islands) is a group consisting of Tung-lo hsü, 221 feet (67^m4) high, lying about $5\frac{1}{2}$ miles north-eastward of Rodd head, and several islets and reefs around it. Hsi-lo hsü (Fairway islet), 183 feet (55^m8) high, 20 lies about 9 cables south-westward of Tung-lo hsü and about one mile eastward of Cow's Horn point, on the mainland. There are depths of less than 5 fathoms (9^m1) for about 4 cables southward of Hsi-lo hsü, and a $1\frac{1}{2}$ -fathom (3^m2) patch lies about $1\frac{1}{2}$ miles southward of the islet. A reef, which dries 19 feet (5^m8), lies nearly 3 cables east-south- 25 eastward of Hsi-lo hsü. Two rocks, each of which dry 5 feet (1^m5), lie about 3 cables off the western coast of Tung-lo hsü. A reef extends about one mile eastward from this island, and Hsiao-lang hsü, 95 feet (29^m0) high, lies on the north-eastern part of this reef. Ta-lang hsü (Great Dragon islet), 142 feet (43^m3) high, lies about 6 cables north- 30 eastward of Tung-lo hsü, and is almost connected to it by reefs. Brown rock, 90 feet (27^m4) high and cleft in two, lies about $1\frac{1}{2}$ miles westward of Ta-lang hsü; about 4 cables further westward is Namoa rock, with a depth of 4 feet (1^m2) over it.

Red rock, 30 feet (9^m1) high, and surrounded by foul ground within 35 a distance of half a mile, lies about 3 miles north-eastward of Shing rock. A shoal, with a depth of $1\frac{1}{2}$ fathoms (2^m7) over it, lies nearly one mile south-south-westward of Red rock.

Waif rock, situated about $2\frac{1}{2}$ miles eastward of Red rock, is 48 feet (14^m6) high; its northern side is steep-to, but rocks lie off its other 40 sides. A reef, which dries about 24 feet (7^m3), lies about 7 cables south-south-westward of Waif rock.

Norton rock (*Lat.* $25^\circ 46' N.$, *Long.* $119^\circ 48' E.$), situated about $3\frac{1}{2}$ miles north-eastward of Waif rock is 52 feet (15^m8) high; a rock, with a depth of less than 6 feet (1^m8) over it, lies about one cable 45 north-westward of Norton rock, and a 6-fathom (11^m0) patch lies about half a mile further north-westward.

Bassett rock, lying about 4 miles south-eastward of Norton rock, is a pinnacle with a depth of 3 fathoms (5^m5) over it.

Warning rocks consists of two rocky islets and several rocks above 50 and below water; the northern islet lies about $1\frac{1}{2}$ miles south-westward of Bassett rock and is 107 feet (32^m6) high. A rocky reef, part of which dries 3 feet (0^m9), lies about half a mile south-westward of the southernmost of the Warning rocks. Owing to the numerous

Charts 1761, 1968, 2412, 1262, 1263.

Chart 1985.

reefs, vessels should avoid the area lying southward of the lines joining Red rock, Waif rock, and the northern Warning rock.

Directions.—To enter Hai-t'an hsia by South entrance, pass
5 between Scattered Yits and Sheng-t'u-li tao, and thence between
the rock reported to lie about 6 cables eastward of Tung-yüeh hsü and
the 3-fathom (5^m5) rock lying about one mile westward of Hsiao-peiheng
hsü; a north-north-westerly course may be steered for Nopass
when the rock is visible, and when the southern extremity of Chung-
10 lou shan bears 112° the triangular patch of sand on the south-west
coast of Hai-t'an tao (view B on chart 1985) may be steered for bearing
027° until Junksail islet bears 353°.

A vessel approaching South entrance from westward, through
Hsing-hua shui-tao, can pass either side of Pai-t'ou hsü and then
15 keep Lu hsü (chart 818) just open southward of that island, bearing
280° astern, until the sand patch on Hai-t'an tao bears 027°, when
steer for it as directed above.

To enter the strait by South-east entrance, from south-eastward,
pass about one mile north-eastward of North Chim rock, and thence
20 steer west-north-westward, so as to pass about 3 cables northward
of Ts'ao hsü, until Junksail islet bears 353°. A vessel approaching
from northward, after rounding Hai t'ou (head) (page 158), should
steer to pass about one mile eastward and southward of South reef,
and thence about one mile southward of Hai-t'an chiao, when a
25 westerly course may be steered until Junksail islet bears 353°.

Chart 817.

After passing through either entrance, steer for Junksail islet bear-
ing 353° until the islet lying close eastward of Tung-cheng hsü bears
270°, when a north-north-westerly course may be steered to pass
30 about 4 cables westward of Junksail islet; thence steer to pass about
2 cables eastward of the beacon on Pass rocks (*Lat. 25° 27' N., Long.*
119° 40' E.). When the western side of Station island is in line
with the eastern side of Junksail islet, bearing 136° (view A on chart
817), keep this mark on astern until Ta-niang shan is in line with
35 Quoin hill, bearing 261°, and the beacons on Pass island are also
in line, bearing 159°; a vessel proceeding northward through the
strait with the south-going tidal stream must take care to avoid
being set on to Pass rocks. Keep Pass Island beacons in line astern,
and whilst on this alignment Ming-chiang hsü will be seen right ahead,
40 about midway between Charles island and Black rocks, bearing about
337° (view B on chart 817). Shortly after the beacon on the largest
Saxby islet comes into line with the beacon on the 7-foot (2^m1) high
rock situated close northward of Middle island, bearing 084°, a
narrow spit, with a depth of 1½ fathoms (2^m7) on its western extrem-
45 ity, extends across the fairway from the eastern side of the channel.
After rounding this spit, course must be altered to pass about 3
cables eastward of Black rocks; a useful mark for this purpose is
to keep the western side of Ch'ang hsü in line with the rock close
westward of Tower rock, bearing 359°.

Chart 1985.

Continue on this course until Talisman peak bears 270°, when
keep Yü-kuo shan in line with the western shoulder of Ku hsü,
bearing 352° (view C on chart 1985); the shoulder of Ku hsü being
flat, it does not form a very definite mark, so that the bearing of

Charts 1761, 1968, 2412, 1262, 1263.

Chart 1985

Yü-kuo shan should be carefully kept. When Inner rock (*Lat.* 25°, 38' N., *Long.* 119° 39' E.) bears 089°, bring Yü-kuo shan, the summit of Ku hsü, and the beacons on Ku hsü in line, bearing 351°, which leads between Mitre rock and the dangers south-eastward. 5 When Mitre rock bears 270° a north-north-westerly course may be steered to pass midway between Ku hsü and Ch'ang hsü; then bring Mitre rock midway between these two islands, and in line with a dip in the hills behind, bearing 217° astern (view D on chart 1985), which leads over Simpson spit in a least depth of 4½ fathoms (8^m2), 10 but as it passes between the 2½-fathom (4^m6) and 3½-fathom (6^m9) patches, this leading mark must be carefully maintained. After crossing Simpson spit, course may be shaped to pass south-eastward of Ta-lao shan.

Chart 817.

15

A vessel passing through Blind channel, in preference to Wilson channel, should pass between Pass rocks and Ashuelot rocks as previously directed. When Low islet bears 078°, alter course northward and steer to pass 2½ cables eastward of Flag island, and from this position steer north-north-westward so as to bring the 20 western side of Pass island in line with the eastern side of Flag island, bearing 170°. Keep this mark on astern until the beacon on the largest Saxby islet is in line with the beacon on the 7-foot (2^m1) high rock off Middle island, bearing 084°, when edge eastward so as to bring the western side of the islet situated close westward of Pass 25 island in line with the eastern side of Flag island, bearing 174°, and keep this mark on astern until Pillar rock is in line with Tricker rock, bearing 034°; Tricker rock may not be sufficiently above water to be seen, and another mark is a pagoda situated about 1½ miles south-westward of Charles island in line with that island, bearing 244°. 30 From this position steer a north-westerly course across the middle ground, in a least depth of about 2½ fathoms (4^m1), and bring Yü-kuo shan in line with the left shoulder of Ku hsü, bearing 352°, thence proceeding as previously directed.

Chart 1985.

35

Although the passage westward of Ta-lao shan is rarely used, and is considered unsafe for vessels of any size, those desiring to use this passage should proceed as follows:—When midway between Ku hsü and Ch'ang hsü keep Mitre rock (*Lat.* 25° 40' N., *Long.* 119° 37' E.) in line with a dip in the hills behind, bearing 217° astern, 40 as previously directed, until Brown rock is just open eastward of Hsi-lo hsü, bearing 007°, when steer for it on that bearing; when Yü-kuo shan bears 292° course may be shaped to pass about 2 cables westward of Hsi-lo hsü. Then gradually bring the western side of Ch'ang hsü into line with the western side of Hsi-lo hsü, 45 bearing 188° astern, which leads between Brown rock and Namoa rock; when Ta-lang hsü is entirely open north-eastward of Brown rock, a more easterly course may be steered.

Charts 817, 1985.

Tidal streams.—The tidal streams enter Hai-t'an hsia during the 50 rising tide by both the northern and southern entrances, and meet between Rocky islands and Middle island; in this vicinity, especially between Hill and Middle islands, there are heavy overfalls, dangerous to boats, when the wind is strong. During the falling tide the tidal

Charts 1761, 1968, 2412, 1262, 1263.

Charts 817, 1985.

streams separate between Rocky islands and Middle island, and run out by both the northern and southern entrances.

In the channel eastward of Pass rocks, the tidal streams run in the direction of the channel, at a maximum rate of from 4 to 5 knots at springs, but in the more open parts of the strait this rate is only from 2 to 3 knots.

The tidal stream entering Hai-t'an hsia by South-east entrance divides northward of Ts'ao hsü, one portion flowing north-north-westward, and the other south-south-westward.

Chart 1985.

EASTERN COAST OF HAI-T'AN TAO.—Southern part.—Islands and dangers.—Anchorage.—Rambler bay lies on the northern side of the headland forming the southern extremity of Hai-t'an tao, of which Hai-t'an chiao is the south-eastern extremity. On the north-eastern side of the bay are Pai-chiang hsü, described on page 149, and Chiang hsü (Vereker island), 237 feet (72^m2) high; an islet, 101 feet (30^m8) high, lies about midway between Chiang hsü and the coast north-westward, and a rock lies about 1½ cables southward of this islet. There are some above water and sunken rocks in the southern part of the bay.

Chart 818, plan of Dwarf anchorage.

Hai t'ou (head), lies about 2½ miles north-eastward of Chiang hsü, and Kuan-yin-ao mao-ti (Dwarf anchorage) is westward of the head. This anchorage is frequently used by vessels unable to proceed against the north-east monsoon; it is safe as far as the holding ground is concerned, but during the north-east monsoon a heavy swell sets in, particularly at certain times of the tide, which causes a vessel to roll very heavily.

Hai t'ou (Lat. 25° 28' N., Long. 119° 51' E.), is 202 feet (61^m6) high, and Kuan-yin-ao chiao (Dwarf point) is its south-western extremity. K'ang-fei chiao (Camfield point) lies about 3½ cables north-westward of Kuan-yin-ao chiao. Shui hsü (Sui islet), 25 feet (7^m6) high, lies about one mile west-north-westward of K'ang-fei chiao. Hsiao-hsiung shan (D'Arcy hill), 242 feet (73^m8) high, lies about 7 cables north-north-westward of K'ang-fei chiao. Kuan-yin-ao (Kwong-yim-oh) village lies close northward of K'ang-fei chiao.

A rocky patch, with a depth of one fathom (1^m8) over it, lies about 6½ cables west-south-westward of Kuan-yin-ao chiao. A reef, which dries 10 feet (3^m0), lies about 2½ cables north-westward of Kuan-yin-ao chiao; fishing stakes extend about 4 cables south-westward from this reef. A rock, 15 feet (4^m6) high, lies about one cable southward of K'ang-fei chiao.

Good anchorage can be obtained, in a depth of 5½ fathoms (9^m6) sand, with the lighthouse on Niu shan (Turnabout island) (page 160) just open southward of Kuan-yin-ao chiao, bearing 106°, and K'ang-fei chiao bearing 007°; small vessels can anchor westward of K'ang-fei chiao, in a depth of 3½ fathoms (6^m4), sand, with Kuan-yin-ao chiao bearing 114°.

Central part.—Islets and dangers.—Hsien shan (Chinsu islet) lies on a drying reef extending about half a mile eastward from Hai t'ou, and there are several other islets between it and the head; a 5-fathom

Charts 1761, 1968, 2412, 1262, 1263.

Chart 818, plan of Dwarf anchorage.

(9^m1) patch lies about 2½ cables south-westward of the southern extremity of Hsien shan.

Lao-ch'ing-wa lieh-tao (Lochinvar islets) consists of three islets, with a number of rocks and reefs around ; Ta shan, the largest islet, 103 feet (31^m4) high, lies with its southern point about one mile north-eastward of the north-eastern point of Hai t'ou. The passage between these islets and the coast is foul.

Chart 1985.

Beal rock, with a least depth of 1½ fathoms (3^m2) over it, lies about 7 cables east-north-eastward of the northern extremity of Ta shan. There are tide races for about three-quarters of a mile eastward of Lao-ch'ing-wa lieh-tao.

Hai-t'an wan (bay) lies between Lao-ch'ing-wa lieh-tao and Wang-yeh shan (Tan head), situated about 3½ miles northward ; it occupies the central part of the eastern coast of Hai-t'an tao ; the bay has only been partially examined, and there are numerous islets and rocks in it. Bown rock, situated about 1½ miles south-eastward of the northern entrance point, is a steep-to pinnacle rock which dries 6 feet (1^m8).

Wang-yeh shan, 670 feet (204^m2) high, the eastern extremity of Hai-t'an tao, is steep-to on its south-eastern side. Tan point, the north-eastern extremity of the head, is a low cliff with a hummock within ; a shoal, with a rock 8 feet (2^m4) high on it, extends about a quarter of a mile eastward from the point, and a rock, with a depth of less than 6 feet (1^m8) over it, lies about half a mile south-south-eastward of the point. Tan rocks, two of which dry 10 and 15 feet (3^m0 and 4^m6), respectively, lie about one mile eastward of Tan point. Dawson rock, situated about 2½ miles north-eastward of Tan point, is a pinnacle with a depth of 4 fathoms (7^m3) over it.

Northern part.—Islands and dangers.—The land for about 3½ miles westward of Tan point is low, and then rises to Kiun-shan hills, the highest peak of which, Chün shan (Mount Pirie), is situated about 4 miles north-westward of Tan point, and is 1,448 feet (441^m3) high ; Pyramid hill, 760 feet (231^m6) high, lies about 2½ miles south-westward of Chün shan. These hills slope on the north-western side to a flat sandy plain, and the land then rises again to a ridge of hills terminating in Sha-i-an chiao (Saiang point) (Lat. 25° 40' N., Long. 119° 47' E.), the northern point of Hai-t'an tao.

Hulu tao (Kwing island), the largest island off the eastern coast of Hai-t'an tao, lies about one mile northward of Tan point, with Hsiao-hsiang tao (Parry island), 257 feet (78^m3) high, midway between it and the shore westward ; the passage between these two islands, and that between Hsiao-hsiang tao and the coast, are obstructed by reefs and fishing stakes, and the tidal streams are strong, so they should not be used. Foul ground extends about one mile offshore about one mile westward of Tan point. Kwing bay is situated between Tan point and a point situated about one mile westward of Hsiao-hsiang tao.

A rock which dries 10 feet (3^m0), lies about half a mile east-south-eastward of Ta-chai shan (Sharp peak), 446 feet (135^m9) high, situated on the south-eastern side of Hulu tao ; a reef, which dries, lies about half a mile off the coast eastward of this island, and a rock, which dries 9 feet (2^m7), lies close off its north-eastern extremity. Vereker rocks are two pinnacles close together ; the western, with a depth of 2½ fath-

Chart 1985.

oms (4^m1) over it, lies about 2 miles north-eastward of Ta-chai shan, and the eastern has a depth of 3½ fathoms (5^m9) over it.

Channel rock is an islet lying about 1½ miles north-westward of the north-western point of Hulu tao; a rock, which dries 13 feet (4^m0), lies about 3 cables south-eastward of Channel rock, and a rock which dries 20 feet (6^m1) lies about the same distance north-westward. A rock with a depth of 3½ fathoms (6^m4) over it, the position of which is approximate, lies about 1½ miles westward of Channel rock. A reef extends about 6 cables northward from a point situated nearly 2 miles westward of Channel rock, and a group of rocks, which dries 6 feet (1^m8), lies about one mile northward of this point; a shoal, with a least depth of 2½ fathoms (5^m0) over it, was reported, in 1922, to lie about 1½ miles northward of the same point.

Cust islands, 97 and 170 feet (29^m6 and 51^m8) high, respectively, lie within a distance of 1½ miles south-eastward of Sha-i-an chiao. Triplet rocks consist of three rocky islets, the highest, 134 feet (40^m9) high, lying nearly 1½ miles east-north-eastward of Sha-i-an chiao. There is no safe passage between Triplet rocks and the coast. For dangers north-eastward of Triplet rocks, *see* page 155.

Sha-i-an chiao (Saiang point) (*Lat.* 25° 40' N., *Long.* 119° 47' E.) is 115 feet (35^m0) high, and is the termination of a ridge attaining a height of 436 feet (132^m9) in a summit situated about 1½ miles south-westward of the point.

The western side of Hai-t'an tao is described with Hai-t'an hsia.

Niu shan and adjacent dangers.—Light.—Niu shan (Turnabout island), an island situated about 4½ miles east-south-eastward of Hai t'ou, is 218 feet (66^m4) high; there are two small islets close off its southern side, and a rock, awash, lies about 1½ cables southward of the island. A rock, with a depth of less than 6 feet (1^m8) over it, lies about 2 cables west-north-westward of the south-western point of Niu shan. Sunda rock which dries 3 feet (9^m9) lies about 3½ cables northward of Niu shan, with foul ground between. Niu shan should be given a berth of fully three-quarters of a mile.

A light is exhibited, at an elevation of 234 feet (71^m3), from the summit of Niu shan; *see* view below.



*Niu-shan (Turnabout Island) lighthouse bearing 299°, distant 2½ miles.
(Original dated 1943.)*

Hai-t'an shoal, situated about 2 miles westward of Niu shan, has a least depth of 6 fathoms (11^m0) over it; at low water there are very heavy tide rips, and the water is much discoloured over the shoal.

A rock, the position of which is approximate and which has not been examined, was reported, in 1939, about 2 miles north-north-westward of Niu shan. It is possible that this is the rock struck by the s.s. *Sunda*, in 1875, which rock was unsuccessfully searched for, in 1877.

Discoloured water was reported, in 1953, in a position about 3½ miles south-south-westward of Niu shan.

Charts 1761, 1968, 2412, 1262, 1263.

Chart 1761.

Off-lying shoals.—A depth of 12 fathoms (21^m9) was reported, in 1908, about 7 miles southward of Niu shan. In 1929, the s.s. *Hai Yang* obtained a sounding of 11 fathoms (20^m1) about 5½ miles south-eastward of Niu shan; soundings of 15 fathoms (27^m4) were obtained 5
4½ and 3½ miles north-eastward of this position, and the same depth was obtained 7½ miles south-westward of it, with a depth of 12 fathoms (21^m9) between, the bottom in each case being sand. Towards the end of the same year H.M.S. *Magnolia*, sounding in the vicinity of the above positions, confirmed the sounding of 15 fathoms (27^m4) 10
obtained about 6 miles eastward of Niu shan.

A shoal, with a depth of 8 fathoms (14^m6) over it, was reported, in 1954, about 11 miles eastward of Niu shan.

Outlying shoals.—Depths of 12, 10 and 14 fathoms (21^m9, 18^m3, and 25^m6) have been obtained 22, 27, and 29, miles, respectively 15
eastward of Niu shan.

In 1923, the U.S.S. *Ajax* reported a depth of 5 fathoms (9^m1) about 46 miles north-eastward of Niu shan; this shoal has not been examined. In 1930, a depth of 15 fathoms (27^m4) was reported to have been obtained about 15 miles northward of this position. 20

COAST.—*Hai-t'an hsia to Pei-ling-ssu tsui.*—**General remarks.**—Between Cow's Horn point (*Lat. 25° 45' N., Long. 119° 38' E.*) and Pei-ling-ssu tsui (Ragged point), situated about 40 miles north-north-eastward, the coast trends north-north-eastward for about 16 miles, and then recedes to form a large indentation, of which the 25
southern part is the estuary of Min chiang (kiang), which is described on page 167.

Coast.—**Islets and dangers.**—**Anchorage.**—Between Cow's Horn point and Niu t'o, a point situated about 9½ miles northward, the coast consists of a sandy beach. 30

Chart 2400.

Niu t'o is a prominent point 97 feet (29^m6) high. A cluster of islets and rocks, the highest 90 feet (27^m4) high, lies about half a mile northward of Niu t'o, and Mah shan, 100 feet (30^m5) high, lies close inshore about 1½ miles northward of the same point. McCauley 35
rock, situated about 1½ miles north-eastward of Niu t'o, dries 3 feet (0^m9), and a reef, which dries 18 feet (5^m5), lies about half a mile westward of this rock. The coast between Niu t'o and Sha-fang (Shafeng) chiao or Shafang kiao, situated about 7 miles northward, consists mostly of a sandy beach. Miau is a hillock, 104 feet (31^m7) 40
high, situated about 3½ miles north-north-eastward of Niu t'o, and Shiang shan is a sandhill, 103 feet (31^m4) high, lying about half a mile further in the same direction. A rock, which dries 7 feet (2^m1), lies about one mile offshore east-south-eastward of Miau. Pu chiao, a rock 15 feet (4^m6) high, lies about 1½ miles southward of Niu-shan 45
t'ou, which is situated nearly 1½ miles south-south-eastward of Sha-fang chiao. Chu shan, 84 feet (25^m6) high, lies close inshore westward of Pu chiao. Nan-wu-fu chiao, an islet, 70 feet (21^m3) high, lies on the drying coastal bank between Niu-shan t'ou and Sha-fang chiao. Shan-ta hsü (yu), 38 feet (11^m6) high, lies close 50
northward of Sha-fang chiao.

Ching feng, 643 feet (196^m0) high, lying about 1½ miles south-westward of Sha-fang chiao, is a sharply defined summit; the sand on

Charts 1968, 2412, 1262, 1263.

Chart 2400.

the eastern slopes of this hill often shows brightly through the mist when little else is visible. Mei-hua is a village on the coast about one mile westward of Sha-fang chiao. Hou shan, a hill 298 feet (90^m8) high, lies about 1½ miles westward of Mei-hua. Ho-shung shan, a peak situated about 7½ miles westward of the Sha-fang chiao, is prominent.

Ma chiao is a point lying about 5 miles westward of Sha-fang chiao, and Ta hsü (yu) is a small islet close inshore about one mile further westward.

- 10 The entrance to Min chiang, described on page 167, lies between Sha-fang chiao and a point situated about 11 miles northward. Au t'o, 131 feet (39^m3) high, lies about 1½ miles north-eastward of the latter point, and is a headland having the appearance of an island.

Yun-fang pagoda (*Lat. 26° 13' N., Long. 119° 36' E.*) stands on a 15 hill, 1,163 feet (354^m5) high, situated about 4 miles west-south-westward of Au t'o.

Charts 2400, 1988.

About midway between Au t'o and Pei-ling-ssu tsui, situated about 20 miles north-eastward, is Tung-shan peninsula; its summit,

- 20 Tung shan, is 726 feet (221^m3) high.

Chart 2400.

Mu-shu is a small island, 195 feet (59^m4) high, lying about 2¼ miles eastward of Au t'o. Two rocks, 55 and 60 feet (16^m8 and 18^m3) high, respectively, lie about one mile north-westward of Mu-shu, with 25 a rock, drying 10 feet (3^m0) between. There are fish stakes in this vicinity, as indicated on the chart.

Charts 2400, 1988.

Ting-hai wan (bay) situated on the western side of Tung-shan peninsula, is shoal but affords anchorage to small vessels during the 30 north-east monsoon; there are the remains of a walled town on the shore of the bay. A number of islets and rocks, including Flat islet and Hai tao or Crab island, lie southward and south-eastward of Tung-shan peninsula. Ssu-mu hsü (Square rocks), the outermost of these, consist of three islets surrounded by above water and sunken 35 rocks lying within a distance of 3 miles southward of the peninsula.

Chart 1988.

Huang-ch'i wan (Wanki bay), situated about midway between Tung-shan peninsula and Pei-ling-ssu tsui, is frequented by junks and affords good shelter to vessels with local knowledge, but it is 40 unsuitable for large vessels; a rock, awash, lies about a quarter of a mile westward of its eastern entrance point. Claret rocks, from 20 to 30 feet (6^m1 to 9^m1) high, are surrounded by other rocks, above and below water, and the outermost of these lies about 1½ miles southward of the eastern entrance point to Huang-ch'i wan.

- 45 Pei-ling-ssu tsui (Ragged point), also known as Pei-chiao tsui or Pehling tsui, is the extremity of a narrow peninsula extending north-eastward from Huang-ch'i wan; above water and sunken rocks extend nearly half a mile northward from the point. Pei hsü (Diplo islet), with a reef extending nearly one cable from its south-eastern 50 point, lies about half a mile south-eastward of Pei-ling-ssu tsui. The passage between this islet and Pei-ling-ssu tsui is used by small power vessels with local knowledge, which frequently anchor under the lee of the islet lying close north-westward of the point, but the tidal streams are strong.

Charts 1761, 2412, 1262, 1263.

Chart 1988.

There is generally a heavy tide rip and much sea off Pei hsi during the north-east monsoon; during the flood tide there is a strong indraught into Ting-hai wan and the northern side of the entrance to Min chiang.

The coast northward of Pei-ling-ssu tsui is described in Chapter V.

Light.—A light, privately maintained, is occasionally exhibited from a white beacon situated on a point about one mile eastward of the eastern entrance point to Huang-ch'i wan (*Lat.* 26° 19' N., *Long.* 119° 54' E.).

*Chart 2400.***ISLANDS AND DANGERS IN THE APPROACHES TO MIN CHIANG.**

Pai-ch'uan lieh-tao.—Pai-ch'uan lieh-tao is a group of two islands and several islets and rocks; Ling tao, 211 feet (64^m3) high, the southern islet of the group, lies about 15 miles eastward of Niu t'o and is rocky and precipitous. See view on chart 2400.

Tung-ch'uan tao, 384 feet (117^m0) high, separated from Ling tao by a shoal passage one cable wide, is rocky and precipitous. Ta hsi (yu), situated about 7 cables northward of the north-eastern point of Tung ch'uan tao, is a small islet, 87 feet (26^m5) high, with a remarkable thumb on its northern side; rocks above and below water extend about 1½ cables southward from Ta hsi, and a reef, which dries 13 feet (4^m0), lies about midway between the islet and the north-eastern point of Tung-ch'uan tao.

A reef, which dries 12 feet (3^m7), lies about one cable north-eastward of the north-eastern extremity of Tung-ch'uan tao.

Hsiao hsi (Shiao yu), situated about one mile north-eastward of the north-eastern point of Tung-ch'uan tao, is a rock 3 feet (0^m9) high; a small rock, which dries 11 feet (3^m4), lies close south-westward of Hsiao hsi. Yung-liu hsi (yu) is an islet, 134 feet (40^m8) high, lying on a reef extending about half a mile northward from Tung-ch'uan tao. Hsi-niu hsi (yu) 49 feet (14^m9) high, is a rock lying about 4 cables westward of Yung-liu hsi and another rock, 25 feet (7^m6) high, lies about one cable south-westward of Hsi-niu hsi; both these rocks lie on a reef which extends about 2 cables from them in all directions. A 13-foot (4^m0) and an 18-foot (5^m5) patch lie about 9 and 11 cables, respectively, south-south-westward of Hsi-niu hsi; these shoals lie near the western edge of the coastal bank extending westward from the western side of Tung-ch'uan tao.

Hsi-ch'uan tao, 594 feet (181^m0) high, lies nearly 1½ miles north-westward of Tung-ch'uan tao, and its summit is a boulder on the middle of three rounded hummocks; the south-western slopes of the ridge are strewn with sand, and show white in misty weather when little else of the island is visible. Po-lan shih or Breakwater rock, 53 feet (16^m2) high, lies on the outer end of a rocky ridge extending about half a mile south-westward from the north-western point of Hsi-ch'uan tao; this rock, and another rock, 33 feet (10^m1) high, on the ridge, are prominent. An 18-foot (5^m5) patch lies about 4 cables south-south-westward of Po-lan shih.

A sandy spit, with depths of less than 6 fathoms (11^m0) over it, extends about 2½ miles south-westward from the south-western side of Hsi-ch'uan tao, and depths of 6 fathoms (11^m0) are found for a further 2½ miles in the same direction. Underwood banks, with a

Charts 1761, 2412, 1262, 1263.

Chart 2400.

least depth of 4 fathoms (7^m3) over them, lie close westward of the sandy spit.

Anchorage.—Tung-sha ao (road), situated off the south-western side of Hsi-ch'uan tao, affords the best anchorage for vessels from southward waiting to enter Min chiang; the best position is in a depth of 3½ fathoms (6^m9), sand, with the summit of Ma-tsu shan (see below) in line with the 33-foot (10^m1) high rock near Po-lan shih (Lat. 25° 59' N., Long. 119° 55' E.), bearing about 000° and the summit of Yung-liu hsü in line with the southern point of Hsi-ch'uan tao, bearing about 080°.

Light.—**Fog signal.**—A light is exhibited, at an elevation of 257 feet (78^m3), from a white circular tower, 64 feet (19^m5) in height, situated on the north-eastern part of Tung-ch'uan tao. A fog signal is occasionally sounded from the lighthouse.

Dangers between Pai-ch'uan lieh-tao and Ma-tsu shan.—Hsi-pi shih, lying about midway between Pai-ch'uan lieh-tao and Ma-tsu shan, situated about 9½ miles northward, is a group of pinnacles, with a least depth of 10 feet (3^m0) over them. The sea rarely breaks on Hsi-pi shih even with strong north-easterly winds, nor is there any swirl or disturbance of the water to indicate foul ground.

Liu-ch'uan chiao, situated nearly 1½ miles north-eastward of Hsi-pi shih, is a precipitous black rock, 164 feet (50^m0) high; a small rock, 33 feet (10^m1) high, lies close eastward of Liu-ch'uan chiao, and foul ground extends about 3 cables northward and north-westward. Kao-chiu chiao, a rock 22 feet (6^m7) high, lies nearly 4 cables north-north-eastward of Liu-ch'uan chiao.

Pei-ch'uan chiao, situated about 1½ miles north-north-eastward of Liu-ch'uan chiao, is a prominent black rock 20 feet (6^m1) high; a rock three-quarters of a cable westward of it dries 13 feet (4^m0).

Pilot rock, lying nearly 3 miles eastward of Pei-ch'uan chiao, is a pinnacle with a depth of one foot (0^m3) over it; the sea seldom breaks on this rock except at low water.

A 7-fathom (12^m8) patch lies about 2½ miles westward of Pei-ch'uan chiao.

Tai shih, situated nearly 1½ miles northward of Pei-ch'uan chiao, is a group of rocky heads with depths of from 5 feet (1^m5) to 3 fathoms (5^m5) over them. Hsieh chiao, 10 feet (3^m0) high, lie close northward of Tai shih, and there is foul ground close around this rock.

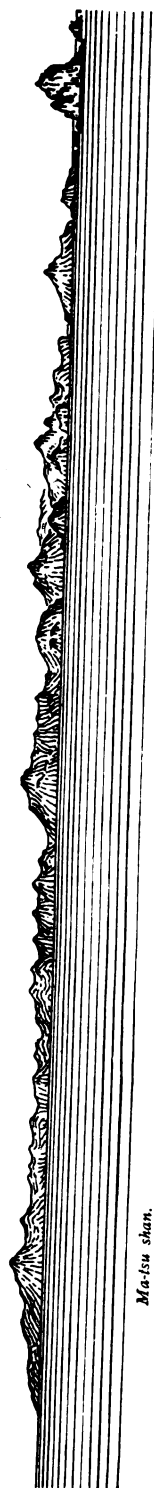
Ma-tsu shan.—**Islets and dangers.**—**Anchorage.**—Ma-tsu shan or Nan-kan-tang shan is a hilly island, 793 feet (241^m7) high, thickly populated and cultivated. Huang-kuan hsü (yu), 191 feet (58^m2) high, is the largest of several islets and rocks lying close off the eastern extremity of Ma-tsu shan. See view on chart 2400 and view facing this page.

Hou ao (ou) lies on the northern side of Ma-tsu shan; O-shou pi is its western entrance point. This bay affords good shelter with winds from between east and west-north-west, though south, in a depth of 5 fathoms (9^m1), about 3 cables offshore, but it is a bad anchorage on account of its rocky bottom. Hsi shih, a 4½-fathom (8^m2) patch, lies about half a mile north-north-westward of O-shou pi.

Han-lin chiao (Lat. 26° 11' N., Long. 119° 55' E.) is the north-western extremity of Ma-tsu shan. Chu-ti ao (ou) is a small cove on the western coast, about half a mile southward of Han-lin chiao.

Charts 1761, 2412, 1262, 1263.

To face page 164.

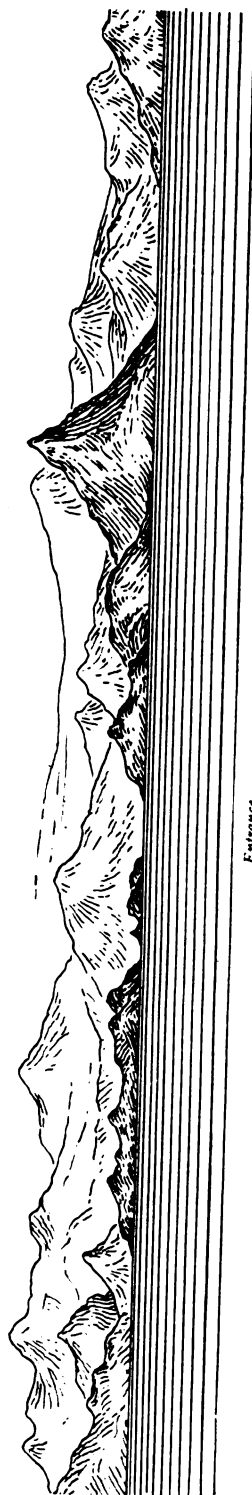


Ma-tsu shan.

Mat-su shan and Liu-ch'uan chiao from near Hsi-pi shih.
(Original dated 1845).

Pai-kan-lang lao.

Liu-ch'uan chiao, bearing
028°, one mile.



Entrance.

Pai-ta,
bearing about 298°.

Entrance to Min Chiang (kiang).
(Original dated 1845).

Pao-chiao shan.

Chart 2400.

Ma-tsu ao (ou), situated on the western side of the island, is a more frequented anchorage, with good holding ground, sheltered from the prevailing north-east wind and also from the swell ; it is convenient for vessels from northward waiting to enter Min chiang. Vessels not exceeding 18 feet (5^m5) in draught can anchor about 3 cables offshore, with the western end of Hsi-ch'uan tao in line with Pai-ya chiao, the south-western point of Ma-tsu shan, bearing about 175°, and a gap in the hills bearing 072°. There are fishing stakes in the vicinity of this anchorage.

Fishing stakes may also be met with off the southern side of Ma-tsu shan, as indicated on the chart.

Niu-chiao chiao, which dries 10 feet (3^m0), lies close inshore on the southern side of Ma-tsu shan.

Ma-tsu hai-hsia.—Dangers.—Ma-tsu hai-hsai (strait), situated between Ma-tsu shan and Pei-kan-tang tao, north-eastward, has a navigable width of nearly one mile between the reefs on either side. Tung shih, a pinnacle with a depth of 3½ fathoms (6^m4) over it, lies in the fairway and about 7 cables north-north-westward of Huang-kuan hsü. Yen shih lies on the northern side of the strait and about 1½ miles north-north-eastward of Huang-kuan hsü, and has a depth of 3 feet (0^m9) over it ; Chiao shih, lying about 2 cables north-westward of Yen shih, is 35 feet (10^m7) high. A 3½-fathom (6^m4) patch lies in the passage between Chiao shih and Ko-li, an islet, 190 feet (57^m9) high, lying close off the southern point of Pei-kan-tang tao, to which it is connected by a drying ridge of stones and sand. Chin hsü (yu) is a small islet, 102 feet (31^m1) high, lying about 1½ miles westward of Ko-li.

Pei-kan-tang tao.—Islands and rocks.—Pei-kan-tang tao is an island rising to two prominent peaks, the highest being 947 feet (288^m6) high. The south-eastern part of the island is connected to the remainder by a sandy isthmus. There are several villages on the island, which is well cultivated. Tangki tao, 184 feet (56^m1) high, lies about a quarter of a mile southward of the south-eastern extremity of the island, with another islet, 150 feet (45^m7) high, between. Good shelter from north-easterly winds can be obtained in Magpie bay, situated on the southern side of the sandy isthmus, in a depth of 4½ fathoms (8^m2), mud, with the summit of Tangki tao (*Lat.* 26° 13' N., *Long.* 120° 01' E.), bearing 126°, distant half a mile.

Bluff head, 216 feet (65^m8) high, is the eastern extremity of an island lying about 2½ cables off the north-eastern coast of Pei-kan-tang tao.

Ching-au is an island, 295 feet (89^m9) high, separated from the northern end of Pei-kan-tang tao by a channel 2 cables wide, partly obstructed, however, by a reef, with a depth of 19 feet (5^m8) over it, extending about one cable southward from Ching-au. Kiao-tse is an islet, 260 feet (79^m2) high, almost connected to the north-eastern point of Ching-au. A rock, which dries 18 feet (5^m5), lies close off the north-western point of Ching-au ; a group of rocks, the northern and highest of which is 72 feet (21^m9) high, lies nearly half a mile north-north-westward of this point. A rock, with a depth of 1½ fathoms (2^m7) over it, lies about a quarter of a mile north-north-eastward of the 72-foot (21^m9) rock.

Fishing stakes may be met with off the western coasts of Ching-au and Pei-kan-tang tao, as indicated on the chart.

Charts 1761, 2412, 1262, 1263.

Chart 2400.

The south-western of Trio rocks lies about $1\frac{1}{2}$ miles south-eastward of Bluff head and is 46 feet (14^m0) high. The north-eastern and largest rock, lying nearly $2\frac{1}{2}$ miles eastward of Bluff head, is 101 feet 5 (30^m8) high and is split into two parts; close south-eastward of it is a rock which dries 17 feet (5^m2). The third rock lies about a quarter of a mile south-south-eastward of the highest rock and is 78 feet (23^m8) high. There is a safe channel between these rocks and Pei-kan-tang tao.

Chart 1988.

Kao-teng hsü or Pei-sha tao (Pai-sha) lies about $1\frac{1}{2}$ miles north-westward of Ching-au, and rises to an elevation of 560 feet (170^m7) at its southern end; foul ground extends nearly one mile eastward from this island. The middle of the passage between Kao-teng hsü and 15 Ching-au is obstructed by the rocks lying north-westward of the latter, described above. An islet lies close off the western point of Kao-teng hsü, and about half a mile west-north-westward of this point is Gordon rock, which dries 7 feet (2^m1). A rock, 10 feet (3^m0) high, lies about $1\frac{1}{2}$ cables west-north-westward of the northern point 20 of Kao-teng hsü, with foul ground between, and about $1\frac{1}{2}$ miles north-eastward of this point is a black rock, 25 feet (7^m6) high.

Off-lying rock.—Hei yen (Black rock), 70 feet (21^m3) high, lies about 8 miles north-eastward of Kao-teng hsü and about 7 miles eastward of Pei-ling-ssu tsui (page 162); there is discoloured water 25 northward of the rock. Bamboo ropes, connecting floating stakes to fish traps, are laid westward and south-westward of Hei yen.

Chart 1761.

Outlying islands and rocks.—**Anchorage.**—Tung-sha or Alligator islet (*Lat.* $26^{\circ} 09' N.$, *Long.* $120^{\circ} 24' E.$), situated about 24 miles 30 eastward of Ma-tsu shan, is a barren rock about 40 feet (12^m2) high.

Yin shan (Tung-yung), situated about $13\frac{1}{2}$ miles north-north-eastward of Tung-sha, is an island about 500 feet (152^m4) high, with steep cliffy coasts; there is a large village on its western side. Rocky ledges extend about a quarter of a mile from its south-western 35 side. Another island lies close north-westward of Yin shan, and appears as part of that island except on north-easterly or south-westerly bearings; a reef extends about half a mile northward from the western island. The narrow passage between these two islands is shoal, and a rock lies in the fairway. Bertha cove, situated on the 40 southern side of the western island, affords good anchorage and smooth water, during the north-east monsoon, for vessels with local knowledge, in depths of from 4 to 6 fathoms (7^m3 to 11^m0). In March, 1931, H.M.S. *Stormcloud* anchored off Bertha cove, in a depth of about 10 fathoms (18^m3), and found good shelter and good holding 45 ground; the anchorage was approached bearing 000° , which then led clear of all fishing stakes. A power vessel should not approach Bertha cove after dark, as it is encumbered with bamboo ropes connecting floating stakes to fish traps, which would probably foul the propeller. Similar obstructions exist south-westward of Lang tao.

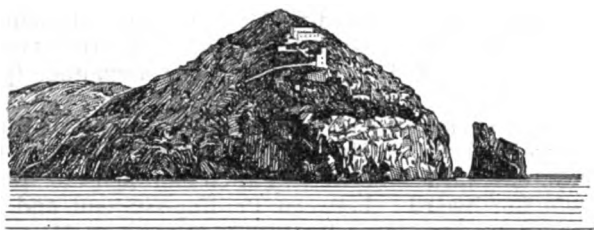
50 Lang tao (Larne islet) lies about 14 miles westward of Yin shan, and has some large boulders on it. A ledge extends about half a mile south-westward from the islet; a rock, awash, lies close off the northern point, and a rock 9 feet (2^m7) high, lies about 2 cables eastward of this point. Lang yen (Larne rock), situated about 5

Charts 2412, 1262, 1263.

Chart 1761.

miles southward of Lang tao, is low and flat ; a reef extends about 2 cables northward. A reef, awash, lies about 5 miles north-north-westward of Lang tao ; its position is stated to have been passed over on several occasions without any indication of shoal water having been seen. The islands and dangers northward of Hei yen are described in Chapter V.

Light.—Fog Signal.—A light is exhibited, at an elevation of 325 feet (99^m1), from a white circular tower, 46 feet (14^m0) in height, situated on the eastern slope of Yin shan ; two white square buildings are situated on the slope of the hill immediately above the lighthouse. A fog signal is occasionally sounded from the lighthouse. See view below.



*Yin-shan (Tung-yung) lighthouse from eastward.
(Original dated 1932.)*

Outlying banks and danger.—Depths of from 15 to 25 fathoms (27^m4 to 45^m7) were reported, in 1930 and 1932, about 15 to 20 miles eastward of Tung-sha, as indicated on the chart.

A shoal with a depth of 5 fathoms (9^m1) over it, which has not been examined, was reported, in 1923, about 23 miles south-eastward of Tung-sha (*Lat.* 26° 10' N., *Long.* 120° 24' E.).

A shoal, of unknown depth, was reported, in 1920, about 18 miles southward of Tung-sha.

Chart 2400.

MIN CHIANG.—General remarks.—Depths.—Min chiang (kiang) flows generally south-eastward to enter the sea through a wide estuary. The large city of Fu-chou (Foochow) lies near its northern bank about 33 miles from the entrance. Between Fu-chou and the entrance are two harbours, Ma-wei anchorage and Nan-t'ai anchorage.

The mouth of Min chiang lies between Sha-fang chiao (page 161) and a point, situated about 11 miles northward, but this space is mostly occupied by the islands Huang-ch'i shan or Hwangki shan and Wei-tou tao or Weitow tao, as well as a number of smaller islands and banks, which are described in detail on page 169, and between which are various passages. Only one channel, that between Huang-ch'i shan and Wei-tou tao, is buoyed and in general use. Mei-hua chiang, the passage along the southern side of Huang-ch'i shan has only been partially examined, and is not generally used by shipping, but was reported, in 1950, to have been used by a vessel drawing 10 feet (3^m0). Wei-tou shui-tao (channel), situated between Wei-tou tao and Ch'uan-shih tao, close eastward, is narrow, intricate, and unsuitable for general shipping ; it is much used by junks, and these emerge from the river in fleets conducted by a single pilot.

Charts 2412, 1262, 1263.

Chart 2400.

Wu-chu chiang, the channel northward of Wei-tou tao is dangerous for navigation, and it is blocked by a stone barrier at Wu-chu men, near the north-western point of Wei-tou tao.

- 5 The bar extends for a distance of about 8 miles eastward of the south-eastern extremity of Huang-ch'i shan, and consists of hard sand, which dries in places; the heavy rollers on the bar caused by a gale soon subside. In 1949, the least depth on the outer bar of the main channel was about 12 feet (3^m7), and on the inner bar, south-
10 ward of Ch'uan-shih tao, about 11 feet (3^m4). On account of the changes constantly taking place in the channel over the bar and in the river caution is necessary, and the river must not be entered without a pilot, who must be relied on implicitly. As a rule the pilots do not take a vessel exceeding 24½ feet (7^m5) in draught over the
15 bar, but during the north-east monsoon, at spring tides, vessels with a draught of 26½ feet (8^m1) can reach Ma-wei anchorage (page 173).
Charts 2400, 1988.

- Approaches.**—There are three main approaches to Min chiang. From southward: between Hsi-ch'uan tao and the coast of the main-
20 land. From eastward: between Pai-ch'uan lieh-tao and Ma-tsu shan. From northward: between Pei-ling-ssu tsui and Kao-teng hsü, and thence westward of Pei-kan-tang tao and Ma-tsu shan.

- The water for many miles outside the river is muddy and discoloured, so that sunken rocks or shoals are not visible unless marked
25 by breakers.

Chart 2400.

- Pilots.**—The pilot boat waits at anchor eastward of Inner buoy (see page 170). The senior pilots will, however, board deep draught vessels eastward of Entrance buoy (see page 170), if notified in
30 advance. A motor sampan, painted yellow, is used for this purpose. All pilots are Chinese and, since the beginning of 1948, have been licensed by the National Pilotage and Navigation Bureau. There are thirteen pilots for Min chiang, three of whom are licensed for deep draught vessels.

- 35 The pilot boats are painted yellow, with no distinguishing marks on them or their sails; when on pilotage duty they fly a flag the upper half white and the lower half red. Only licensed pilots should be engaged.

- Vessels proceeding to Ma-wei anchorage or Nan-t'ai, and requiring
40 a pilot, should make the request through the Harbour-master at Fu-chou, informing him of the time of arrival off Chi-hsing chiao (Lat. 26° 05' N., Long. 119° 49' E.); on arrival at either of these places the Harbour-master should be informed at an early date if a pilot is required on leaving. It is not considered necessary for
45 vessels with a draught of less than 13 feet (4^m0) to employ a pilot on leaving Ma-wei anchorage, provided that all the buoys are in position and have been checked on the passage up.

- Tidal streams.**—The west-going stream runs from 4½ hours before high water until 1½ hours after high water at Min river (Admiralty
50 Tide Tables Standard Port), and sets in towards Ch'uan-shih tao from north-eastward; the east-going stream runs from 1½ hours after high water until 4½ hours before the next high water, except during freshets, when it begins earlier and runs for a much longer period.

Charts 1761, 2412, 1262, 1263.

Chart 2400.

During the rainy season in April, May, and June, the west-going stream runs for a shorter period, and the east-going stream is correspondingly longer. During heavy freshets vessels do not swing to the west-going stream.

Off-lying dangers.—Buoys.—Chi-hsing chiao situated about 8 miles north-eastward of Sha-fang chiao, is a shoal with some drying rocks on it; two of these rocks are sharp pinnacles which dry 13 feet (4^m0). Fan-chu shih, situated about 3 cables northward of the south-western pinnacle of Chi-hsing chiao, is a pinnacle with a depth of 2 fathoms (3^m7) over it. A red and black chequered whistle buoy, with "Min" painted on it in white, is moored about 4½ cables east-north-eastward of the north-eastern pinnacle of Chi-hsing chiao; it was reported to be missing, in 1952. High Sharp peak, situated about one mile west-north-westward of the north-western point of Wei-tou tao, bearing 292° and just open northward of the northern side of Ch'uan-shih tao, leads about half a mile northward of Chi-hsing chiao and northward of the buoy.

Pan-yang chiao, situated about 4½ miles northward of Chi-hsing chiao, is a pinnacle with a depth of 3 feet (0^m9) over it. A red and black chequered buoy, with "Aymar" painted on it in white, surmounted by a black diamond, is moored about 2½ cables east-south-eastward of Pan-yang chiao.

Lung-ya shih lies in the approach to Wei-tou shui-tao and about 2½ miles north-eastward of Chuan-shih tao; it consists of two heads, about 2½ cables apart, with a depth of 4 feet (1^m2) over each, sand and mud over rock. A black conical buoy, privately maintained, marks these rocks, and a red conical buoy is shown on the chart about 3 cables north-north-westward of it.

Islands and banks in the entrance.—Huang-ch'i shan is the largest of the islands in the entrance, and lies with its south-eastern extremity about 3½ miles north-westward of Sha-fang chiao (*Lat.* 26° 02' N., *Long.* 119° 42' E.); its summit, Pai-yun shan, is 905 feet (275^m8) high and prominent. Pai-hou hsü (yu) is an islet, 131 feet (39^m9) high, lying off the south-eastern corner of Huang-ch'i shan. The inner end of Mei-hua Chiang, the passage between Huang-ch'i shan and the mainland southward, is encumbered with islands, including Yen-hang chou (Yenwen chow), San-fen chou (chow), Fu-ch'i chou (chow), and Hou-yu chou.

Wei-tou tao, the second largest island, lies northward of Huang-ch'i shan; its summit, Ch'iu-lung (Maan) shan, is 779 feet (237^m4) high. Ch'uan-shih tao lies close eastward of Wei-tou tao, with several islets between; its summit, Pao-chiao shan, is 601 feet (183^m2) high. Ting t'ou is a point on the northern side of Ch'uan-shih tao.

The islands between Huang-ch'i shan and Wei-tou tao are described on page 170.

See view facing page 164.

Fu-shou sha is a drying bank extending about 4 miles eastward from the south-eastern extremity of Huang-ch'i shan; Shan-yu sha, another drying bank, lies between Fu-shou sha and the shore southward. Yao-tzu sha is a drying bank lying with its outer end about 5 miles eastward of Ch'uan-shih tao, with another drying bank, T'ieh-pan sha, between.

Charts 1761, 2412, 1262, 1263.

Chart 2400.

Main channel over the bar.—Buoys.—Anchorage.—Changes are frequently taking place in the channel over the bar, which runs close southward of Yao-tzu sha and T'ieh-pan sha. The positions of the
5 buoys are approximate only, and the buoys are also liable to be washed away.

Entrance buoy lies about $2\frac{1}{4}$ miles north-westward of Chi-hsing chiao, and is moored on the northern side of the entrance to the channel; it is a red conical buoy surmounted by a black sphere.
10 The Outer bar, also known as Wai-lang-chiang sha, lies close westward of this buoy.

Central buoy, situated on the northern side of the channel and about $4\frac{1}{4}$ miles west-north-westward of Chi-hsing chiao, is a red conical buoy surmounted by a black inverted frustum.

15 Jih-ch'uan chiao (*Lat. $26^{\circ} 05' N.$, Long. $119^{\circ} 43' E.$*), situated on the eastern end of Fu-shou sha, and about $5\frac{1}{4}$ miles westward of Chi-hsing chiao, is a black pinnacle which dries 19 feet (5^m8); it lies about one mile southward of the 3-fathom (5^m5) line on the southern side of the channel.

20 Inner buoy, situated about 2 miles north-westward of Jih-ch'uan chiao and on the northern side of the channel, is a red conical buoy surmounted by a black sphere. The Inner bar, also known as Nei-wai-lang-chiang sha lies close westward of this buoy.

I-mi shih, a pinnacle with a depth of 6 feet (1^m8) over it, lies about
25 4 cables westward of the southern point of Ch'uan-shih tao; a red can buoy is moored close south-eastward of this rock and on the northern side of the channel.

Anchorage can be obtained between the Outer and Inner bars in a pool with depths of from $3\frac{1}{4}$ to 5 fathoms (5^m9 to 9^m1), but this
30 anchorage is reported to give no protection to vessels at high water. Vessels using this anchorage must take care to avoid the submarine cable; see below.

Cables.—Three submarine cables, indicated on the chart, are landed on the eastern side of Ch'uan-shih tao. The southern cable crosses
35 the main channel over the bar. See page 37.

Inner bar to Ma wei.—Buoys and beacons.—The main channel of Min chiang passes northward of Huang-ch'i shan and southward of Ch'uan-shih tao and Wei-tou tao.

K'un-chiang shan (Hukiang), 123 feet (37^m5) high, is an island
40 lying off the north-eastern corner of Huang-ch'i shan, and about $1\frac{1}{4}$ miles westward of the southern extremity of Ch'uan-shih tao. Pai-ta is an islet, about 50 feet (15^m2) high, lying on the southern side of the fairway close to the north-eastern corner of K'un-chiang shan, with Peng shih, a small rock above water, close south-eastward of it.
45 Ching hsü (yu), 61 feet (18^m6) high, lies about half a mile west-north-westward of Pai-ta.

Kuan-yin tao, a long narrow island, extends fully one mile west-north-westward from Ching hsü, and close northward of its centre is Yeh-ya shih, which dries 5 feet (1^m6); a stone barrier extends about
50 2 cables northward of the island close westward of Yeh-ya shih, and its outer end is marked by a black conical buoy. Hsi-feng shih, a pinnacle with a depth of 3 feet (0^m9) over it, lies about one cable off the southern extremity of Wei-tou tao, and is situated on the northern side of the channel opposite Ching hsü; the depths in this

Charts 1761, 2412, 1262, 1263.

Chart 2400.

vicinity are very irregular, which causes a heavy overfall during the strength of the tidal stream. Temple rock, with a depth of 2 fathoms (3^m7) over it, lies on the northern side of the channel and about 8 cables westward of the southern extremity of Wei-tou tao; Temple rock is marked by a red buoy, and the channel here, between this buoy and the buoy marking the stone barrier on the southern side of the channel is only about 2 cables wide; a stone barrier also extends from Temple rock to the shore northward. Mat-su-yin (Lat. 26° 09' N., Long. 119° 37' E.), a rock with less than 6 feet (1^m8) over it, lies close inshore north-north-westward of Temple rock.

Chart 2400, plan of Chin-pai men.

Nan-kuei is an islet lying on the southern side of the channel nearly 2 miles westward of Ching hsü; Pei-kuei islet lies on the northern side of the channel and about 2½ cables north-north-westward of Nan-kuei. Po-ching hsü (yu), lying about 1½ cables south-westward of Pei-kuei, covers at high water; vessels should pass not less than half a cable southward of this islet. Chin-p'ai men, entered from eastward between Po-ching hsü and Nan-kuei, is dangerous for strangers, particularly at or near spring tides, as the rapid tidal streams then cause eddies that occasionally cross the channel, in which case a vessel might refuse to answer her helm; the pass should, therefore, never be taken without local knowledge, and then only at slack water. Vessels should avoid meeting or passing each other in Chin-p'ai men; those proceeding against the stream must wait clear of the pass until those going with the stream are clear thereof. There is a flagstaff on the northern point of Huang-ch'i shan, which forms the southern side of the pass. Chin-p'ai sha, which dries near its eastern end, extends nearly one mile westward from the northern point of Huang-ch'i shan and is constantly changing; Chin chiao is situated at its eastern end. Li shih, a rocky shoal with a least depth of 9 feet (2^m7) over it, lies near the western end of Chin-p'ai sha and about 3½ cables off the southern side of the river. A black conical buoy is moored on the northern edge of Chin-p'ai sha.

Chart 2400.

Shih tsui is a point on the northern side of the river about 1½ miles westward of the northern point of Huang-ch'i shan. Men-pien is a town on the northern bank of the river just above Shih tsui. Yung hsü (yu) lies about 1½ miles south-south-westward of Shih tsui, on the outer edge of a narrow bank extending from the western side of the river. A bank, which dries in patches, extends more than half way across the river from the north-western side of Huang-ch'i shan and is known as Huang-ch'i ch'ien-t'an. Ta-lu chiao lies on the southern part of Huang-ch'i ch'ien-t'an and nearly one mile southward of Yung hsü, and is submerged 5 feet (1^m5) at high water spring tides; a black granite beacon stands on this rock. Lung chiao (Lat. 26° 05' N., Long. 119° 31' E.) is situated on the western bank and about 1½ miles south-south-westward of Yung hsü; a reef extends half a cable south-eastward from this point, which must be given a berth of 1½ cables. Hsin-feng chiao is a rocky ledge, with a least depth of 3 feet (0^m9) over it, lying close off the western bank and about three-quarters of a mile south-south-westward of Lung chiao;

Charts 1761, 2412, 1262, 1263.

Chart 2400.

a red conical buoy is moored close eastward of this ledge. T'ing-t'ou-hsiang is a town on the western bank of the river just below Hsin-feng chiao.

5 *Chart 166, plan of Ma wei anchorage and approaches.*

Min-an men is entered about three-quarters of a mile southward of Hsin-feng chiao, and is a portion of the river nearly 3 miles in length and about 3 cables wide; the shores on either side are fairly steep-to, with high land close within. The town of Min-an is situated
 10 on the western bank, about $1\frac{1}{2}$ miles above Hsin-feng chiao. Yuan shan, an islet on which there is a prominent white mark, lies close off the same bank and nearly three-quarters of a mile above Min-an; Ho chiao, a rock with a depth of less than 6 feet (1^m8) over it, lies close off the eastern side of Yuan shan. Vessels proceeding down the
 15 river with an out-going stream must guard against an eddy setting on to Ho chiao.

Ta hsü (yu) is situated on the eastern side of the southern end of Min-an men, and is of a light colour owing to its being cultivated and covered with vegetation; Ma-chu shan, a hill 351 feet (107^m0)
 20 high, lies nearly one mile north-eastward of Ta hsü.

A spit, with depths of 18 feet (5^m5) and less over it, extends about $2\frac{1}{2}$ cables northward from Ta hsü. Niao-hsü (Niao-yu) chiao, with a depth of 4 feet (1^m2) over it, lies on a rocky ledge extending about half a cable from the south-western extremity of Ta hsü. Niu chiao,
 25 with a least depth of 3 feet (0^m9) over it, is a patch of rocky ground lying about 2 cables westward of Ta hsü; a black can buoy marks the north-western side of this patch and the channel lies westward of this buoy; a stone barrier has been constructed from the eastern side of the patch to the south-western side of Ta hsü. Hsiao hsü
 30 (yu) lies about $2\frac{1}{2}$ cables southward of Ta hsü and is connected to it by a drying flat; a prominent tree, 25 feet (7^m6) high, stands on its southern end. Yang-hsü (Yang-yu) is a town on the eastern bank opposite Hsiao hsü; Li-hsü (Li-yu) shan lies close southward of it.

Mao hsü (yu), a raised mound surrounded by low marshland,
 35 which gives it the appearance of an islet at high water, lies on the southern bank of the river about one mile above Yang-hsü.

Chiang-hsi (Kiang-hsi) chiao lies about one cable off the eastern bank of the river and about $1\frac{1}{2}$ miles above Hsiao hsü, and is awash at high water. There is a flagstaff on the point situated about 3
 40 cables south-westward of Chiang-hsi chiao, and about half a mile south-south-eastward of it is Shih-tou ting, 616 feet (187^m8) high. About three-quarters of a mile south-westward of Chiang-hsi chiao is Customs point, on which there is a Custom house and a flagstaff. Customs point lies on the eastern side of the entrance to Ying-ch'ien
 45 chiang, on the eastern bank of which the town of Ying-ch'ien is situated. Shih chiao (*Lat. $25^{\circ} 58' N.$, Long. $119^{\circ} 27' E.$*), with depths of less than 6 feet (1^m8) over it, lies close inshore about 2 cables above the entrance to Ying-ch'ien chiang.

On the opposite side of the river and about 8 cables north-north-
 50 westward of Customs point, is a village named Lo-hsing-t'a, and a pagoda, 92 feet (28^m0) high, which stands on a hill 93 feet (28^m3) high; there is a prominent chimney about $1\frac{1}{2}$ cables north-eastward of Lo-hsing-t'a. This village lies at the southern extremity of Ch'ing chou (chow), a large flat cultivated island, which, together with

Chart 166, plan of Ma wei anchorage and approaches.

Lo-hsing sha, a smaller island, eastward, lies on a bank, which dries and extends more than half way across the river from the western bank ; this bank is continually changing. A red can buoy surmounted by a triangle, is moored off the eastern side of the above bank about 7 5 cables south-westward of Niu chiao ; a similar buoy, named Ching-chow and sometimes called Lo-hsing, is moored about 2 cables west-north-westward of Chiang-hsi chiao.

The high ground on the north-western side of the river between Min-an and Lo-hsing-t'a rises to an elevation of over 2,000 feet 10 (609^m6), and is called Kun-lun shan.

Chart 166, plan of Ma wei to Foochow.

The river divides at Customs point, one branch, named Wu-lung Chiang, running southward of the large island of Nan-t'ai tao, and the other, named Pei Chiang, northward of Nan-t'ai tao to Nan-t'ai. 15

Chart 166, plan of Ma wei anchorage and approaches.

Hsiao-ma chiao, situated nearly 2 cables southward of Lo hsing-t'a, is a pinnacle which dries 8 feet (2^m4), and foul ground extends about half a cable westward. Westward of Hsiao-ma chiao (Lat. 25° 59' N., Long. 119° 27' E.), at the confluence of Wu-lung Chiang and Pei 20 Chiang, the river is obstructed by partly drying sandbanks which are extending eastward ; these sandbanks are constantly changing, especially at freshets.

Ma-hsien is a large Chinese village situated on the eastern entrance point of Pei Chiang and about 4 cables west-north-westward of 25 Lo-hsing-t'a. There is a small European settlement on the hill above the village. About 3 cables northward of Ma-hsien is Ma-wei, where there is a Naval yard. Ta-ma chiao, a pinnacle which covers at high water, lies about one cable westward of the point on which Ma-hsien is situated ; a small rock lies offshore between Ta-ma chiao and the 30 point.

For the description of the river between Ma-wei and Nan-t'ai, see page 176.

Lights.—A light is exhibited, at an elevation of 25 feet (7^m6), from a red bamboo pole surmounted by a red spherical daymark, 35 on Hsiao-ma chiao.

A light is exhibited, at an elevation of 25 feet (7^m6) from a red bamboo pole surmounted by a red spherical daymark, situated on Ta-ma chiao ; this light is unreliable, as the rock cannot be ap- 40 proached in bad weather.

Ma-wei anchorage.—Berthing.—Ma-wei anchorage, also known as Lo-hsing-t'a mao-ti, is situated between Chiang-hsi chiao and Ma-hsien, and is about 22 miles above the outer bar of Min Chiang and 11 miles below the city of Fu-chou, of which it is the port. Considerable scouring has taken place between Chiang-hsi chiao and 45 Hsiao-ma chiao, thereby widening the anchorage in this vicinity.

Vessels moor within 2 cables of the south-eastern shore, berths being allotted by the harbour authorities. In 1948 the berths were numbered 1 to 10 and were marked by large numerals painted on the foreshore to indicate where the vessel's stem should be when middled. 50 The holding ground is not good and the tidal streams run strongly.

The berth allotted to a vessel arriving is indicated by flags at the Custom house on the right bank.

There are two T-shaped wharves at Lo-hsing-t'a ; vessels should

Chart 166, plan of Ma wei anchorage and approaches.

not moor within a distance of one cable from these wharves, so as to allow sufficient room for vessels using them to swing.

The steps below the Post office and the Naval yard steps at Ma-wei are suitable for landing at all times. Boats using the slipway below the Harbour-master's office on the southern shore should do so with caution, especially at low water.

Tidal streams.—The water in the river is generally highest in the north-east monsoon, and lowest in the south-west monsoon. Remarkable rises of the water occur now and then, as in August, 1885, during a typhoon, when spring tides rose 24 feet (7^m3).

The tidal streams at Ma-wei anchorage run in the direction of the deep channel at a rate of from one to 3 knots according to the age of the moon. The out-going stream during freshets attains a rate of over 5 knots, but in the confined portions of the river, particularly in the passage between the stone barriers near Temple rock (page 171), at Chin-p'ai men, and between Min-an men and Ta hsü, it often exceeds 7 knots and great care is necessary in navigating these parts of the river on account of the strong eddies.

The in-going stream begins 5½ hours before high water, and the out-going an hour after high water, except during heavy rains in the interior, when it commences earlier, and sometimes overcomes the in-going stream altogether.

The height of the tides and the times of the turning of the streams are influenced by the direction and force of the wind.

Freshets occur occasionally after heavy rain in June, July, and August. In August, 1886, the ships in Ma-wei anchorage did not swing to the in-going stream for three days, and several dragged their moorings on the out-going stream.

Chart 166.

Regulations.—Vessels anchoring in the Port of Fu-chou were formerly subject to rules and regulations which may still be in force. Extracts of these are given below.

1. The Port includes all that part of Min chiang between Chin-p'ai men and the stone bridge across the river at Nan-t'ai.
2. The anchorage known as Ma-wei anchorage, within the limits of which all foreign vessels (excepting those going up the river to Fu-chou) shall lie when loading or discharging, is that part of the river above No. 9 mark (near Chiang-hsi chiao) on the southern side and below a straight line running westward from the point on which Ma-hsien is situated (*Lat.* 25° 59' N., *Long.* 119° 27' E.) to the opposite side of the river.
3. Vessels proceeding up the river to Fu-chou shall load and discharge between the stone bridge and Messrs. Jardine, Matheson & Co.'s jetty, unless special permission is obtained from the Customs Authorities to work elsewhere.
4. Any vessel nearing the anchorage shall be boarded by the deputy to the Harbour-master; the pilot on board shall moor the vessel in a safe berth.
5. Vessels shall take up the berths assigned to them by the Harbour-master, or by his deputy, and shall on no account change berth without first having obtained permission from the Harbour-master. They shall, however, shift berth if required to do so by the Harbour-master.

Chart 166.

6. All vessels shall be moored taut, and shall keep a clear hawse.
7. All vessels lying in the anchorage shall exhibit two bright lights from sunset to sunrise ; one, the riding light, where it can best be seen, not less than 20 feet (6^m1) above the deck, and the other 5 at the stern.
8. A vessel arriving with a contagious or infectious disease on board, or a disease regarding the contagious or infectious nature of which there may be doubt or suspicion, or a vessel any of whose passengers or crew have died since leaving the last port, or on board which there 10 is a corpse other than one regularly shipped as freight, shall not come nearer than the No. 9 mark on the southern side of the harbour. She must fly at the fore the Quarantine or Plague flag (Q or L flags of the International Code of Signals) and must allow no one to embark or to disembark without permission from the 15 Harbour-master's office.
9. Cannon, small arms, rockets, or other signal light shall not be fired on board any vessel within the limits of the Port, without written permission from the Harbour master's office.
10. Ballast or ashes must not be thrown into the river between Chi- 20 hsing-chiao buoy and the stone bridge at Nan-t'ai, but must be put into ballast boats and landed above high water mark. Care must be taken to prevent any ballast, etc., from falling overboard in handling.
11. Vessels arriving at the port with explosives or other dangerous 25 cargo in whatever quantity (except kerosene) shall anchor or moor one mile below the lower limit of the harbour, and shall abide by the instructions of the Harbour-master concerning discharge.
12. Vessels arriving with kerosene or other inflammable or dangerous cargo shall exhibit a red flag at the fore by day and a red light at 30 night. They may work cargo between sunset and sunrise. All reasonable precautions must be taken against fire. Kerosene may be discharged during the night, in which case a special permit is required.
13. Except for some reasonable purpose, *e.g.* to signal their arrival 35 or departure, vessels are forbidden to sound their steam-whistles or sirens within the limits of the anchorage.

Charts 2400, 166, plan of Ma wei anchorage and approaches.

Directions.—The best time for a vessel with a speed of 10 knots to arrive at the outer bar is at high water ; in March 1935, H.M.S. 40 *Grimsby* arrived at the Entrance buoy at high water on the outer bar, and encountered slack water all the way to Ma-wei anchorage. The directions given hereafter are from the latest information received in 1933, 1948 and 1949.

Chart 2400.

45 The bar is crossed by passing close southward of Entrance, Central, and Inner buoys. From the Inner buoy course may be shaped to pass southward of I-mi-shih buoy, and thence between the red buoy and black buoys near Temple rock, which mark the passage between the stone barriers extending from either side of the channel, having 50 previously taken care to avoid Hsi-feng shih (*Lat.* 26° 08' N., *Long.* 119° 38' E.). Great care is necessary when passing between the barriers, as the tidal streams run very strongly through it, up to 6 knots ; if a vessel is not quick in turning westward there is danger

Charts 1761, 2412, 1262, 1263,

Chart 2400.

of being set on to the mud banks on the northern side of the river which were reported, in 1948, to extend further than shown on the chart, due to silting caused by the northern barrier; the vessel
 5 should therefore keep the southern buoy aboard. After passing the barrier, a westerly course may be steered to pass northward of Nan-kuei, and not less than half a cable southward of the beacon on Po-ching hsü. When nearing Chin-p'ai men from either end vessels must herald their approach by one long blast on the whistle,
 10 and, if there is any probability of their meeting in the pass, a power vessel going with the tidal stream has the right to proceed through first. Thence pass between the buoy marking Chin-p'ai sha and the northern shore, and, when past this buoy, steer for a conspicuous clump of trees in Tang-kuan, a small village about 3 cables northward
 15 of Yung hsü, bearing 238°; when the eastern extremity of Yung hsü bears 222° steer for it on that bearing, subsequently altering course to about 211° so as to pass fairly close eastward of this islet. The regulations given for Chin-p'ai men hold good for Min-an men.

Chart 166, plan of Ma wei anchorage and approaches.

20 After proceeding through Min-an men, vessels should pass close westward of the black buoy moored off the western side of Niu chiao, and then steer south-south-westward towards Chiang-hsi chiao, passing south-eastward of the two red can buoys moored off the eastern side of the bank extending from the western side of the river.
 25 After passing westward of Chiang-hsi chiao, the allotted berth may be taken up in Ma-wei anchorage; see page 173.

Harbour facilities.—Supplies.—Communications.—One of the wharves at Lo-hsing-t'a is 182 feet (55^m5) long, and has a depth of 14 feet (4^m3) alongside; the other is 260 feet (79^m2) long, with a
 30 depth of 23 feet (7^m0) alongside.

Lighters are available for handling cargo of vessels at moorings.

The Naval yard at Ma-wei is furnished with modern appliances; large repairs can be undertaken. There are sheer-legs of 50 tons lifting capacity.

35 There is a dry dock at Lo-hsing-t'a, and another at the Naval yard; for the dimensions of the largest, see Appendix I, page 706.

There is a small general hospital.

Fuel oil can be obtained; it is pumped aboard from lighters. Large quantities of coal can be supplied in baskets from lighters, at the
 40 rate of 40 tons per hour.

Fresh water and boiler water are obtainable.

Fresh provisions are plentiful.

Ma-hsien (Lat. 25° 59' N., Long. 119° 27' E.) is connected with the general telegraph system.

45 Cables are relayed to countries overseas from a station on Ch'uan-shih tao.

Climatic Table.—See Chapter I, page 66.

Chart 166, plan of Ma wei to Foochow.

Ma-wei to Nan-t'ai.—Islands.—Beacons.—Depths.—Tao-chiang
 50 chou (Tao-kiang chow), Ma-hang chou (chow), and Chung-chi chou (chow) are islands lying off the eastern end of Nan-t'ai tao, at the junction of Wu-lung chiang and Pei chiang. Between Ma-wei and Nan-t'ai, a distance of about 8½ miles, the banks are almost entirely lined by training walls, which cover at half tide, or by groynes. The

Charts 1761, 2412, 1262, 1263.

Chart 166, plan of Ma wei to Foochow.

training walls are marked by beacons, as also are the outer ends of the groynes. The navigable channel varies in width from about $3\frac{1}{2}$ to $1\frac{1}{2}$ cables. The local Conservancy Board have undertaken the improvement of the river by means of training works and dredging. In February, 1934, the Conservancy Board stated that the navigation channel had been dredged to a minimum depth of 17 feet (5^m2) at high water neap tides, and 20 feet (6^m1) at high water spring tides, over a maximum width of 200 feet (61^m0); at such states of the tide vessels with draughts not exceeding 15 feet (4^m5) and 18 feet (5^m5), respectively, could proceed up to Nan-t'ai. Owing to continual silting, it is possible that the depths mentioned above may not be always maintained.

Yu-tun chou (chow) and Ao-feng chou (chow) are islands fronting the northern bank and situated, respectively, about $1\frac{1}{2}$ miles above Ma-wei and $1\frac{1}{2}$ miles below Nan-t'ai. Chiang-tou chou (chow), also known as Siemasen chou, is an island fronting the southern bank just eastward of Nan-t'ai. A stone bridge crosses the river at Nan-t'ai, passing across the western end of Chung chou (chow), an island lying in midstream. San-hsien chou (chow) is another island in midstream, about half a mile above Chung chou (*Lat. $26^{\circ} 03' N.$, Long. $119^{\circ} 18' E.$*)

Chart 166, plan of Nan Tai anchorage.

Nan-t'ai anchorage.—Depths.—Mooring buoys.—Nan-t'ai anchorage is situated between Chiang-tou chou and the stone bridge crossing the river at Nan-t'ai. The depths in the mooring area were reported, in 1934, to be from 13 to 18 feet (4^m0 to 5^m5).

A number of mooring buoys are available in the harbour. Vessels moor head and stern. The passage between the lines of mooring buoys is marked by buoys.

It was reported, in 1936, that a vessel drawing 20 feet (6^m1) berthed at a pontoon in the harbour. The largest vessel to arrive during 1937 had a draught of 12 feet (3^m7).

Chart 166, plan of Ma wei to Foochow, and plan of Nan Tai anchorage.

Fu-chou.—Communications.—The city of Fu-chou (Foochow), situated about 2 miles northward of the northern bank of the river, is built on a plain inside an amphitheatre of hills and is surrounded by walls; there are suburbs between the city and the river. There was a population, in 1952, of about 400,000. The Europeans mostly reside at Nan-t'ai, on the northern side of Nan-t'ai tao, on the southern side of the river.

There is a radio station at Fu-chou, *see* page 39.

Charts 2400, 1761, 2402, 1252, 1263.

CHAPTER IV.

FORMOSA STRAIT.—NORTHERN COAST OF LUZON.—LUZON STRAIT.—
FORMOSA.—PESCADORES ISLANDS.

Chart 1968.

FORMOSA STRAIT AND SOUTHERN APPROACH.—Formosa strait is the wide passage bounded westward by the coast of China between Lien-hua-feng chiao (page 89) and the entrance to Min chiang (page 167), and eastward by the western coast of Formosa. Pescadores islands (pages 211 to 224), separated from the western coast of Formosa by Pescadores channel, lie on the eastern side of the strait. Except for Formosa banks, lying in the middle of the southern part of Formosa strait, and the dangers adjacent to the China coast, the strait is deep.

Chart 2661b.

Banks in the southern approach.—**Current.**—Vereker banks, situated in the southern approach to Formosa strait and about 112 miles south-south-westward of Lien-hua-feng chiao, are two dead coral banks with deep water between and around them; South Vereker bank has a least depth of 32 fathoms (58^m5) over it, and North Vereker bank has a least depth of 35 fathoms (64^m0) over it. There are heavy overfalls and tide rips in their vicinity.

A sounding of 32 fathoms (58^m5) was obtained by the U.S.S. *Solace*, in 1900, about 37 miles south-westward of South Vereker bank, in approximately Lat. 20° 40' N., Long. 115° 18' E.

In February the prevailing current sets between west-north-west and west-south-west in the vicinity of Vereker banks, with a rate of from a half to one knot; at times it sets to windward, and with calms or light south-westerly winds it sets between south-south-east and east-south-east, at a rate of from a quarter to one knot.

Chart 362.

Pratas island and reef.—**Seaplane landing.**—**Buoys.**—**Radar reflector.**—Pratas island or Tung-sha tao (Lat. 20° 42' N., Long. 116° 43' E.), situated about 136 miles southward of Lien-hua-feng chiao, lies on the western side of Pratas reef, described below. The island is covered with scrubby bush, and is about 40 feet (12^m2) high to the top of the vegetation; in the hazy weather which prevails in this locality during the north-east monsoon, the island is seldom visible beyond a distance of 5 or 6 miles, and the breakers at the edge of the reef may possibly not be seen until within a distance of one mile. The island is composed of sand, and encloses a shallow inlet entered on its western side, which affords shelter to the Chinese fishermen

Charts 1761, 2412, 1262, 1263.

Chart 362.

who come here in the early part of the year. There is a settlement on the north-eastern side of the island, consisting of a weather station and camp comprising a number of buildings including an observation tower, 24 feet (7^m3) high, on which there is a flagstaff. A radar reflector and two radio masts stand close southward of the settlement. A clump of trees stands on the southern side of the island about half a mile from the eastern end; this was reported, in 1949, to be the first visible indication of the island. Sea birds are numerous in the breeding season.

There are two jetties on the north-eastern side of the island, the principal one being of concrete and about 60 feet (18^m3) long, with a depth of 6 feet (1^m8) at its head, in 1949. The other jetty is only available for small boats, and there are several rocks in its vicinity. On the southern side of the eastern end of the island is a small wooden pier.

Pratas reef is a circular coral reef, about 11 miles in diameter, enclosing a lagoon; the southern, eastern and northern sides of its circumference, as well as a portion around Pratas island, just dry at low water and are steep-to along the greater part of their outer edges. North-west Horn or Pei-hsi chiao, and South-west Horn or Nan-hsi chiao, are the extremities of the main drying part of the reef. North-east point, East point, and South-east Bend, are situated on the eastern side of the reef. Two channels, known, respectively, as North and South channels, give access to the lagoon, one on either side of Pratas island; many coral knolls exist in these channels and in the lagoon. South channel is by far the better of the two channels into the lagoon, as it is wider, a little deeper, and is comparatively free from coral knolls. A white sand spit, which breaks with a westerly swell, lies on the northern side of this channel and about 2 miles southward of the western extremity of Pratas island. North channel is about 2½ miles northward of Pratas island, and it contains numerous coral heads, some with a depth of only 2 feet (0^m6) over them.

An area on the western side of the reef has been swept to a depth of 59 feet (18^m0); it consists of a belt from half a mile to one mile wide outside the 10-fathom (18^m3) line, and covering the approaches to North and South channels.

There is an emergency seaplane landing about 2 miles eastward of Pratas island; it is about a mile long, 7 cables wide and the north-western and south-eastern sides are each marked by five spar buoys.

In December 1949, a can buoy surmounted by a flag was moored about 1½ miles south-westward of the western extremity of Pratas island (*Lat.* 20° 42' N., *Long.* 116° 43' E.), on the western edge of the reef.

Off-lying shoal.—A coral shoal, with a least known depth of 5 fathoms (9^m1) over it, which has not been examined, lies outside the charted 100-fathom (182^m9) line about 2½ miles south-westward of the western extremity of Pratas island. Depths in the vicinity are irregular and vary from 5 to 35 fathoms (9^m1 to 64^m0); it is considered likely that the shoal extends north-eastward to the reef.

Wrecks.—The wreck of a steam vessel, with one funnel and two masts, standing upright on the south-eastern edge of Pratas reef, was reported in 1934; this is one of two wrecks situated near South-

Chart 362.

east Bend. The fore part of a vessel, about 40 feet (12^m2) in height, standing up-ended on the north-eastern edge of the reef was reported in 1926. There are several other wrecks above water on the drying
 5 part of the reef, for the positions of which the chart should be consulted.

Anchorage.—Although Pratas reef is steep-to in most parts, there are several spots where, in case of necessity, a vessel might find anchorage outside the breakers, particularly on the western side,
 10 abreast the middle of North and South channels. At each of these places there is good anchorage in the north-east monsoon in depths of from 10 to 20 fathoms (18^m3 to 36^m6); the position
 15 abreast South channel is the better of the two. In 1949, H.M.S. *St. Brides Bay* reported anchoring in 16 fathoms (29^m3) in a position
 246° 2½ miles from the radar reflector on Pratas island (*Lat.* 20° 42' N., *Long.* 116° 43' E.). Later in the same year, H.M.S. *Hart* reported
 finding a 31 fathoms (56^m7) in the same position, and anchored in
 19 fathoms (34^m7) about 3½ cables further north-north-eastward.

A vessel of light draught might even anchor in safety on the reef
 20 in the middle of South channel, in a depth of 3½ fathoms (6^m4), or cross it and take up a berth inside the lagoon on a fine sand bottom.

Directions.—During the strength of the monsoon vessels should always endeavour to pass to leeward of Pratas reef, on account of the
 25 invariable set of the current to leeward; soundings give no warning of a vessel's approach to it, and the weather is frequently thick and
 hazy in this vicinity. The safest quarter to make the reef from is the western, as the island is on this side, and the currents run in a
 north-east or south-west direction, according to the prevailing
 monsoon; approaching the reef a vessel should be coned from aloft,
 30 as with the sun in a favourable position the bottom can be seen in a depth of 10 fathoms (18^m3).

Pratas reef, lying in the route between Manila and Hong Kong, is a serious danger to vessels using that route, especially in the north-
 east monsoon, when strong gales and thick clouds are sometimes
 35 prevalent for weeks together.

Currents.—**Tide rips.**—At distances of from 20 to 50 miles north-westward to north-eastward, through north, of Pratas reef, during
 the times of various searches being made for reported shoals, the
 40 currents in the neighbourhood were found to be exceptionally strong, and tide-rips were frequently observed, which occasionally
 appeared like breakers. Ripples have been observed, in a position
 about 22 miles northward of Pratas reef (*Lat.* 20° 40' N., *Long.* 117° 48' E.). On one occasion, in 1889, Captain the Hon. F. C. P.
 Vereker reported that, on the night of 22nd March: "Breakers were
 45 distinctly heard, with regular intervals between the breaks, and
 altering course I steered towards them, sounding carefully. There was a fair amount of moonlight, and I was nearly convinced we had
 discovered the shoal until I obtained a sounding of 202 fathoms
 (369^m4), muddy bottom, in the centre of the breakers, and found
 50 it was a small but heavy tide rip travelling north-westward."

Chart 2661b.

Off-lying bank and discoloured water.—Discoloured water, the position of which is approximate, was, in 1941, reported in a position
 about 25 miles south-eastward of Pratas reef.

Chart 1263.

Chart 2661b.

A bank, with a least depth of 12 fathoms (21^m9) over it, was reported, in 1952, about 15 miles westward of Pratas island.

Chart 1968.

Formosa banks.—Caution.—Current.—Formosa banks cover a wide area in the middle of the southern entrance to Formosa strait, and have general depths of from 5 to 15 fathoms (9^m1 to 27^m4) over them; the shoalest known patch, 4½ fathoms (8^m2) lies in about Lat. 23° 01' N., Long. 118° 34' E. The shoalest spots on the banks appear to be steep-to, and heavy overfalls generally indicate these sudden changes in depth. Fish in large shoals have been seen on the banks in April and May.

Great caution should be observed when approaching the banks, as from the character of the soundings and the heavy overfalls, it is probable that the depths in places may be less than are indicated on the chart. Less water was reported, in 1952, off the western end of the banks.

During April and May the current generally sets north-eastward at a rate of about one knot, becoming more rapid as Formosa is approached.

Charts 3804, 3805.

NORTHERN SIDE OF LUZON.—General remarks.—The northern side of Luzon is nearly 100 miles long in a general east and west direction. The land is generally high for about 40 miles from the western end and again near the eastern end; in between the land is low with occasional hills.

Tidal streams.—The tidal streams off the northern coast of Luzon follow the general trend of the coast, and there is an eddy stream close offshore during the south-west monsoon.

Coast.—Danger.—Cape Bojeador, the north-western extremity of Luzon, is low near the sea, but rises gradually to broken ridges, bare of trees, about 2 miles inland. The northern limit of the cape is a point situated about 2 miles north-eastward of its south-western extremity, consisting of black coral cliffs underworn by the sea, about 50 feet (15^m2) high, and covered with grass. There is an indentation in the coral reef close southward of this point where landing can be effected, except during north-westerly winds. Foul ground extends about half a mile offshore between this indentation and the south-western extremity of the cape, which should be given a berth of not less than one mile.

Light.—A light (Lat. 18° 31' N., Long. 120° 36' E.), is exhibited, at an elevation of 386 feet (117^m6), from a white octagonal stone tower, 65 feet (19^m8) in height, with a dwelling attached, on the summit of a prominent hill situated about one mile eastward of the northern point of Cape Bojeador; see view below.



Cape Bojeador : lighthouse bearing 151°.
(Original prior to 1912.)

Bangui bay.—Dangers.—Anchorages.—Bangui bay is entered between Negra point, a black rocky point situated 3 miles north-eastward of Cape Bojeador lighthouse, and Dialao point, lying nearly

Charts 1262, 1263.

Charts 3804, 3805.

10 miles north-eastward. A coral ledge extends about $1\frac{1}{2}$ cables northward from Negra point, and there is a large black rock, 6 feet (1^m6) high, about half a cable north-eastward of the point. For $2\frac{1}{2}$ miles eastward of Negra point the coast consists of rapidly eroding cliffs, off which there are some boulders, and a group of white rocks lie close off a point situated about $1\frac{1}{2}$ miles eastward of Negra point. From the eastern termination of the cliffs as far as Burayoc (Burayok) point, situated about $2\frac{3}{4}$ miles southward of Dialao point, the coast is low and fringed by a sandy beach.

A detached rocky shoal, with a least depth of $1\frac{1}{4}$ -fathoms (2^m3) over it, lies about $6\frac{1}{2}$ cables south-westward of Burayoc point, and a shoal, with a depth of $5\frac{1}{2}$ fathoms (10^m5) over it, lies about half a mile south-westward of Sugiab point, which is situated about a mile northward of Burayoc point.

Dialao point is low, wooded, and fringed by a narrow coral reef and a white sandy beach; it is backed by a prominent, reddish-coloured ridge, about 600 feet (182^m9) high, running parallel to the coast and almost bare of trees. This is the only reddish-coloured ridge in the vicinity.

The town of Bangui, situated at the head of Bangui bay, about $2\frac{1}{2}$ miles south-south-westward of Burayoc point, is hidden by trees, but the red roof of the school is visible above them from almost anywhere in the bay.

Bangui bay affords anchorage sheltered from southerly winds. A small cove, lying just northward of Burayoc point, offers shelter for small craft in north-easterly weather.

Tidal streams.—The tidal streams off Dialao point are strong, and there are eddies and whirlpools. The stream sets westward on the rising tide and eastward on the falling tide.

Coast.—Dangers.—Anchorages.—Mayraira point, the northern extremity of Luzon, is situated about $3\frac{1}{2}$ miles east-north-eastward of Dialao point, and is fringed by a reef which extends from about one to $1\frac{1}{2}$ cables offshore. A rocky spit, with a depth of $1\frac{1}{2}$ fathoms (3^m2) over its outer end, extends about three-quarters of a mile north-eastward from the point; heavy tide-rips occur off this spit, which should be given a wide berth.

Between Mayraira point (*Lat. $18^\circ 40' N.$, Long. $120^\circ 51' E.$*) and Baket-baket (Babatkain) point, situated about 11 miles east-south-eastward, in Pasaleng bay, in which there are considerable depths and only fair-weather anchorage; the shores are mostly steep, except at the head, and there are no dangers outside a distance of half a mile offshore.

Dos Hermanos are two prominent rocky cones connected with the shore about one mile south-eastward of Mayraira point; a series of high detached rocks exist in their vicinity; there is a $2\frac{1}{2}$ -fathom (4^m6) pinnacle rock nearly 2 cables offshore close south-eastward of Dos Hermanos.

Baugan bay, situated about one mile southward of Dos Hermanos, affords anchorage for small vessels in a depth of 9 fathoms (16^m5), protected from south-westerly winds.

Madamba rock, about 25 feet (7^m6) high, lies about 3 cables offshore about $3\frac{1}{2}$ miles west-south-westward of Baket-baket point; strong tidal streams, estimated to attain a rate of 2 to 3 knots at

Charts 2661b, 1263.

Charts 3804, 3805.

springs, have been observed in the vicinity of this rock. A 2½-fathom (4^m5) pinnacle rock lies about half a mile northward of Baket-baket point, and heavy tide-rips occurs in its vicinity.

Patapat mountains rise steeply from the south-western shore of 5 Pasaleng bay to an elevation of over 4,000 feet (1219^m2) and Caraballo (Karaballo) mountains rise steeply from the eastern shore. Baket-baket point, which is bold and heavily wooded, is at the northern termination of Caraballo mountains.

The village of Pasaleng (*Lat. 18° 33' N., Long. 120° 56' E.*) stands 10 at the head of Pasaleng bay.

About three-quarters of a mile eastward of Baket-baket point is Lacaylacay point, the termination of a small peninsula extending about half a mile northward. Claveria bay is entered between Lacaylacay point and Centinela point, situated about 2½ miles 15 eastward, and offers shelter except with northerly winds. Cabiungan (Kabikungan) river flows into the eastern part of the bay, and on the western side of its mouth is the town of Claveria, which can be identified from offshore by the metal roof of the school. Centinela point, off which tide-rips occur, is 165 feet (50^m3) high. Anchorage 20 in the bay may be obtained in depths of from 10 to 15 fathoms (18^m3 to 27^m4), sand, about 4 cables northward of Claveria. The southern of two small coves at the eastern end of the bay affords fair protection from north-eastward.

Pata point, situated about 3½ miles eastward of Centinela point, is 25 a knoll, 181 feet (55^m2) high. A river discharges close eastward of the point; the depth on the bar was reported, in 1938, to be 5 feet (1^m5).

Light.—A light is exhibited, at an elevation of 202 feet (61^m6) from a white concrete tower, 21 feet (6^m4) in height, with a dwelling 30 attached, situated on Pata point.

Coast.—From Pata point the coast trends east-south-eastward for about 31 miles to the mouth of Cagayan (Kagayan) river, and is low and sandy.

Pamplona and Abulug rivers break through the beach about 14 and 20 miles, respectively, from Pata point. The entrance channels 35 are encumbered by sand bars and mud flats, and can be entered only in good weather. On an ebb tide, strong streams running out of the rivers cause confused seas at their mouths. The mouth of Abulug river was formerly about 2 miles further westward. Pamplona river has a depth of 6 feet (1^m8) on the bar. The town of Pamplona 40 lies about 2½ miles inland. It is reported that there is a depth of 10 feet (3^m0) on the bar of Abulug river. The town of Abulug lies on the eastern side of the entrance to the river.

The village of Linao (*Lat. 18° 22' N., Long. 121° 36' E.*) is situated on the western entrance point of the Cagayan river, and a river flows out close southward of it.

Light.—A light, named Linao, is exhibited, at an elevation of 36 feet (11^m0), from a white cylindrical iron tower, 30 feet (9^m1) in height, with a white dwelling attached, situated at Linao. See view.



*Linao lighthouse.
(Original prior to 1912.)*

Charts 2661b, 1263.

Charts 3804, 3805.

Cagayan river.—Depths.—Buoy.—Cagayan (Kagayan) river is the largest in Luzon, and the port of Aparri, described below, is situated on the eastern side of its entrance. The bar at the river
 5 entrance generally has depths of from 15 to 18 feet (4^m6 to 5^m5) over it at high water, but the depths are continually changing. The bar should not be attempted without a pilot; at times, during the north-east monsoon, it is impassable and vessels are obliged to seek shelter in Port San Vicente (page 186). Heavy tide-rips occur
 10 off the entrance to the river.

A red conical buoy was formerly moored on the western side of the approach to the entrance to the river, about 1½ miles north-north-eastward of Linao lighthouse; owing to its exposed position, this buoy is liable to drag. It was reported, in 1953, to be missing.

15 **Anchorage.**—The best anchorage outside the bar is in a depth of 10 or 12 fathoms (18^m3 or 21^m9), sand and mud, with Aparri church bearing 180°, and Linao lighthouse bearing 247°.

Aparri.—General remarks.—Supplies.—Communications.—Aparri is the principal port in northern Luzon, and is a port of entry. The
 20 port is so exposed that it is considered unsafe at most times of the year, and is impracticable as a loading port. The town lies on the eastern side of the entrance to Cagayan river, and is very prominent. The harbour is defined as that portion of Cagayan river between Camalaniugan (Kamalaniugan), situated about 6 miles from the entrance,
 25 and the sea. Camalaniugan is the head of navigation for sea-going vessels, but a draught of 6 feet (1^m8) can be carried as far as Lallo, which lies about 12 miles from the entrance. At times freshets occur, causing the river to rise rapidly, when precautions should be taken against the strong currents and debris brought down with it.
 30 The river is inaccessible to ocean-going vessels. Logs and lumber are loaded at the anchorage outside the bar.

The most prominent landmark when approaching Aparri is the church bell tower. The Custom house, with a pilot observation tower at its western end, is the most prominent object in the north-
 35 western part of the town.

Storm signals are displayed at Aparri (*Lat. 18° 22' N., Long. 121° 38' E.*); see page 27. There is a quarantine officer at the port.

Fuel oils and provisions are obtainable, but other marine supplies are scarce.

40 There is regular steamship communication with Manila, which is also connected by road. There is a regular air service to Manila.

Pilotage.—Pilotage for the port of Aparri is compulsory. Pilots are always in attendance when it is possible to enter. Vessels awaiting a pilot should keep Linao lighthouse bearing less than 270°,
 45 and the church at Aparri bearing less than 146°. The pilot launches are painted white, with the letter P on the bow, and fly the pilot flag.

Anchorage.—The usual anchorage for vessels drawing from 10 to 14 feet (3^m0 to 4^m3), after entering the river is in the east channel opposite the town of Aparri. Vessels drawing from 14 to 20 feet
 50 (4^m3 to 6^m1) anchor in the west channel opposite the town.

Climatic table.—See Chapter I, page 67.

Coast.—Tidal streams.—Between Aparri and Batulinao point, situated about 27 miles eastward, the coast recedes and forms a high; it is low and bordered by a sandy beach.

Charts 2661b, 1263.

Charts 3804, 3805.

The town of Buguey, situated about 12 miles east-south-eastward of Aparri, has two prominent buildings, a school with a white metal roof, and an old stone church. Buguey river discharges about 4 miles eastward of the town; its mouth is marked by a small fishing village which is visible from seaward. Buguey river connects with Cagayan river at Aparri, and forms an inland route for small native craft. 5

Batulinao point is at the extremity of a spur of the hills behind the coast, and rises to an elevation of 200 feet (61^m0) about half a mile inland. 10

The tidal streams off Batulinao point have been observed to have a rate of about half a knot, with a slight tidal race near the reef line.

From Batulinao point (*Lat. 18° 23' N., Long. 122° 06' E.*) the coast trends generally north-north-eastward for about 8 miles to Nulton point, and then turns eastward for about 5 miles to Escarpada point, the north-eastern extremity of Luzon. Palauí island, described below, lies off the coast opposite Nulton point; between its southern side and the coast of Luzon is Port San Vicente, which is described on page 186. Between Nulton point, which is low, and Escarpada point, the coast is high and bordered by reefs and detached rocks. A bank, with depths of from about 5 to 7 fathoms (9^m1 to 12^m8) extends about 2 miles northward from Escarpada point. *Charts 3804, 3805; 3545, plan of Port San Vicente.* 15

Palauí island.—Dangers.—Palauí island lies with its south-eastern corner less than half a mile northward of Nulton point. The island 25 is 990 feet (301^m7) high, and very rugged and heavily wooded.

The western side of the island is bold and rocky with narrow sand beaches in some of the bights. Puerto point, a high wooded bluff, is the south-western extremity of the island.

A drying reef projects about 1½ miles eastward from Verde point, 30 which is situated near the middle of the eastern side of the island; near its outer edge are Escucha and Cent islets, 60 and 10 feet (18^m3 and 3^m0) high, respectively; Escucha islet is wooded.

Charts 3804, 3805.

Cape Engano, the northern point of the island, is the extremity of 35 a peninsula projecting about half a mile from the coast and enclosing a cove on its south-western side. It is mostly wooded with some parts of the hills on the north-western side covered with grass.

Dos Hermanos are two islets lying close north-eastward of Cape Engano; the southern islet is 150 feet (45^m7) high. There are some 40 rocks off the north-eastern point of the island, about one mile eastward of Cape Engano. Gran Laja is a low rock, on which the sea breaks, lying about one mile north-eastward of the north-eastern corner of Palauí island. The bottom is very irregular for about 2½ miles eastward of Gran Laja.

Light.—A light is exhibited, at an elevation of 327 feet (99^m7), from a grey granite tower, 47 feet (14^m3) in height, with a red-roofed dwelling attached, situated on the summit of the hill above Cape Engano (*Lat. 18° 35' N., Long. 122° 08' E.*). The lantern is white. See view. 50



*Cape Engano lighthouse.
(Original prior to 1912).*

Charts 2661b, 1263.

Charts 3804, 3805.

Anchorage.—Beacons.—Small vessels may obtain good anchorage in the cove situated south-westward of Cape Engano, in a depth of 19 fathoms (18^m3), protected except from north-
5 westerly and westerly winds.

Two white beacons, each 12 feet (3^m7) high, and consisting of diamond-shaped horizontal slats on a pole, are situated at the head of the cove. A vessel should keep these in line, bearing 114°, and anchor about half a mile from the head of the cove. The beacons
10 were reported, in 1947, to be missing.

Chart 3545, plan of Port San Vicente.

Port San Vicente.—General remarks.—Port San Vicente, situated between the southern side of Palaui island and the coast of Luzon, consists of an outer and an inner harbour. It is the best, and the
15 only thoroughly protected harbour in northern Luzon available as a place of refuge for vessels during typhoon weather, but the holding ground is not good. It is used by vessels bound for Aparri when the bar of Cagayan river is too rough to be crossed. The approach to the port from eastward is narrow and tortuous, and encumbered with
20 reefs to such an extent that it should not be attempted.

Harbours.—Dangers.—Buoys.—The outer harbour lies southward of San Vicente island, which lies on a drying reef which extends about three-quarters of a mile from the southern coast of Palaui island, and is situated about midway between Puerto and Nulton
25 points. New Orleans point (*Lat. 18° 30' N., Long. 122° 08' E.*), the southern extremity of San Vicente island, is a prominent green bluff; the surrounding reef extends nearly 1½ cables southward from this point, but on the western side of the island a spur of the reef extends southward to a position about 3 cables south-westward of
30 the point.

The inner harbour, a small cove between the north-eastern side of San Vicente island and the southern side of Palaui island, is practically landlocked. The entrance is between San Vicente island and Morgan point, situated about three-quarters of a mile north-eastward, but
35 the opening between the reefs on either side is only just over two cables wide.

A detached reef, with a depth of 3 feet (0^m9) over it, lies a quarter of a mile westward of Nulton point; it is marked on its north-western side by a red conical buoy. The fairway to the inner harbour lies
40 between this buoy and the reef extending about 3½ cables from the eastern side of San Vicente island, and has a least width of 1½ cables abreast the buoy. The buoy was reported, in 1951, to be missing.

The shores of the inner harbour are fringed with reefs which greatly restrict the space available. A shoal, with a depth of 13 feet
45 (4^m0) over it, lies near the middle of the harbour, and a shoal patch, with a least depth of a quarter of a fathom (0^m5) over it, lies on its south-western side. There is a mooring buoy on the north-eastern side of the harbour.

Dungan point lies about half a mile east-north-eastward of Nulton
50 point, and Smith point lies about a quarter of a mile north-eastward of Morgan point.

Rona islet, 25 feet (7^m6) high and wooded, lies on a drying reef in the middle of the fairway about 7 cables north-eastward of Smith point.

Charts 2661b, 1263.

Chart 3545, plan of Port San Vicente.

Light.—A light is exhibited, at an elevation of 31 feet (9^m4), from a white concrete pillar, 31 feet (9^m4) in height, situated on the eastern extremity of the reef extending from the eastern side of San Vicente island.

Anchorage.—**Directions.**—Anchorage may be obtained in the outer harbour, with Escucha and Rona islets in line, bearing 037°, and Puerto point bearing 277°, in a depth of about 7 fathoms (12^m8), mud, but it is exposed to westerly and south-westerly winds.

Small vessels may obtain anchorage in the middle of the inner harbour, in depths of from 4 to 4½ fathoms (7^m3 to 8^m2), mud.

To approach the outer harbour from northward, a vessel should give the western side of Palaui a fair berth, and pass three-quarters of a mile southward of Puerto point; thence steer eastward until Rona and Escucha islets are in line, when steer for them, which will lead to the anchorage.

To enter the inner harbour from the anchorage recommended in the outer harbour, steer for the light structure, and round its southern and eastern sides at a distance of from three-quarters of a cable to one cable, anchoring about a quarter of a mile north-westward of it. The red buoy situated westward of Nulton point may be passed close-to on its north-western side.

Tidal streams.—Between the light structure and Nulton point (*Lat.* 18° 31' N., *Long.* 122° 09' E.) the tidal streams set north-eastward on the rising tide and south-westward on the falling tide at a maximum rate of from 3 to 4 knots.

Charts 3804, 3805.

LUZON STRAIT.—Luzon strait is the wide area between the northern coast of Luzon and the southern extremity of Formosa. It contains two groups of islands, namely, Babuyan islands and Batan islands, separated from each other by Balintang channel; the former are separated from the northern coast of Luzon by Babuyan channel, and the latter are separated from the southern extremity of Formosa by Bashi channel.

Babuyan channel.—**Current.**—**Tidal streams.**—Babuyan channel is about 15 miles wide at its western entrance, between Pata point and Fuga island, and about 20 miles wide at its eastern entrance, between Cape Engano and Camiguin (Kamigin) island; it is entirely free from dangers, and there are great depths throughout the fairway.

During the south-west monsoon the current sets strongly northward in Babuyan channel. A plainly marked tide-rip, the broken water northward of which appeared as a line of breakers, has been observed between Cape Bojeador and Fuga island.

The tidal streams appear to set into Babuyan channel on the rising tide from both ends, though their precise meeting place is unknown. Eddies and tidal races are numerous. The north-going current from Cagayan river, when in flood, can be felt up to 20 miles northward of its mouth.

Babuyan islands.—Babuyan islands form a roughly circular group lying between Babuyan and Balintang channels. The principal islands are Fuga, Dalupiri, Camiguin (Kamigin), Calayan (Kalayan), and Babuyan. The channels between the islands are safe and deep, and their coasts are generally steep-to.

Charts 2661b, 1263.

Charts 3804, 3805.

Fuga island.—Dangers.—Anchorages.—Fuga island, the south-western island of the group, lies with its western extremity about 16 miles north-north-eastward of Pata point. The island is 625 feet
5 (190^m5) high and hilly, except in the neighbourhood of Kiking point (*Lat. 18° 53' N., Long. 121° 29' E.*), its eastern extremity, where it is low. The two small islands, Barit and Mabag (Mabaag) lie off its western end. Barit is 87 feet (26^m5) high.

The depths along the southern side of Fuga are irregular, and
10 temporary anchorage may be obtained here when there is a smooth sea.
Chart 3545, plan of Musa bay.

Musa bay is a deep basin lying between the western extremity of Fuga, and Barit and Mabag islands. Although sheltered from the sea, the holding ground is poor, and the anchorage has been reported
15 to be unsafe with strong north-easterly winds.

Papasakyan point, the western extremity of Fuga island, lies on the eastern side of Musa bay. Villa Vicenta, situated about half a mile north-eastward of Papasakyan point, is a small settlement from which cattle are shipped. Steamers call occasionally from Manila and
20 Aparri. Minapa point is the north-western corner of Fuga island.

Near Fuga island the bottom is very rocky. Barit island is surrounded by a reef, and shoal water extends about half a mile off its north-western side. Shoal water extends about three-quarters of a mile west-north-westward from the western end of Mabag island.
25 The best entrance into Musa bay is from southward between Barit and Fuga islands, but a bank, with a least depth of 37 feet (11^m3) over it, extends nearly half way across it from Fuga island.

The western entrance, between Barit and Mabag islands, is deep but narrow.

30 The northern entrance, between Mabag and Fuga islands, is encumbered by a reef extending about a quarter of a mile from Mabag island (*Lat. 18° 53' N., Long. 121° 15' E.*), and a rock, awash, near its centre. A depth of 4 fathoms (7^m3) can be carried, but it should not be used except in case of necessity.

35 The best anchorage is near the north-eastern side of Barit island, in depths of from 14 to 15 fathoms (25^m6 to 27^m4), where the bottom is rotten coral and sand. The rate of the tidal streams is considerable.

Charts 3804, 3805.

Dalupiri island.—Dangers.—Anchorages.—Dalupiri, the western-
40 most island of the group, lies with its southern extremity about 7½ miles northward of Mabag island; it has a regular aspect, with a hilly ridge rising to an elevation of 903 feet (275^m2) in the southern part. In calm weather anchorage can be obtained off the eastern side of the island, but the holding is poor. Visita, the largest settlement, stands
45 in a small plain on the eastern side of the island. A 28-foot (8^m5) patch lies about one mile eastward of Visita, and a 3-foot (0^m9) patch lies about half a mile offshore off the western coast about 4 miles north-westward of the southern extremity of the island.

Banoa is a settlement situated at the head of a small bight on the
50 western side of the southern extremity of Dalupiri island; vessels with local knowledge can obtain anchorage off this hamlet, but there are depths of over 20 fathoms (36^m6) about half a mile offshore. Landing can be effected about 2 cables south-eastward of the settlement, where there is a break in the coastal reef.

Charts 2661b, 1263.

Charts 3804, 3805.

Irao islet, 55 feet (16^m8) high, surrounded by shoals for a distance of about a quarter of a mile, lies about 2 miles south-westward of the southern extremity of Dalupiri island.

Camiguin island.—Off-lying bank.—Camiguin (Kamigin) island, the south-eastern of the Babuyan islands, lies with Geulous point (*Lat.* 18° 49' N., *Long.* 121° 51' E.), its southern extremity, about 21 miles north-westward of Cape Engano. The island is mountainous, with its highest peak, 2,603 feet (610^m5) high, lying about 3 miles westward of Nagayaman point, the eastern point of the island; the higher peaks are frequently obscured by clouds. Mount Camiguin, an extinct volcano, 2,372 feet (723^m0) high, is situated in the southern part of the island; there are deep valleys between this mountain and the lesser peaks around it, so that when first sighted from the southward they appear as separate islands. With the exception of part of Mount Camiguin and a narrow strip along the north coast, the entire island is wooded. The coasts are fringed by a narrow steep-to coral reef. A number of high rocks lie on or close to the coastal reef extending from the south-eastern side of the island; among them are Cuminichiray rock, 119 feet (36^m3) high, lying about 3 miles north-eastward of Geulous point, and a rock, 136 feet (41^m4) high, about 2 miles further north-eastward. Machibat point is at the north-eastern extremity of the island. Port San Pio Quinto, described below, and Dibuang bay, are situated, respectively, on the western and eastern sides of the island.

A prominent yellow and red cliff, about 300 feet (91^m4) high, situated southward of Port San Pio Quinto, forms a good landmark for this vicinity.

Camiguin (Kamigin) bank, with depths of less than 20 fathoms (36^m6) over it, extends about 4 miles north-westward from a position about 3½ miles north-westward of the north-western point of Camiguin island; the least depth on this bank is 11 fathoms (20^m1), coral, and it is marked by tide-rips.

Chart 3545, plan of Port San Pio Quinto.

Port San Pio Quinto.—Islands and dangers.—Anchorage.—Port San Pio Quinto lies between Magasasut point, situated about 4 miles north-north-westward of Geulous point, and Nagpalbosan point, lying nearly 3½ miles north-north-eastward. It affords good shelter with north-easterly winds, and it is the only place in the Babuyan islands where a large vessel can lie in tolerable safety, the bottom being less rocky than in Musa bay. There is regular sea communication with Aparri, but the port is of no commercial importance.

Pamoctan (Pamoktan) island, 670 feet (204^m2) high and steep-to all round, divides the entrance into two channels. This island is a good landmark when approaching the harbour; from the northward or southward it appears as a single cone, but from the westward it shows two distinct peaks, the northern one being the higher of the two. Pinon islet, 110 feet (33^m5) high with foul ground extending about 1½ cables from its northern and southern extremities, lies westward of Magasasut point, with a clear channel, about 1½ cables wide, between; a rock, 15 feet (4^m6) high, lies about a quarter of a mile southward of the islet.

The southern entrance to the port, between Magasasut point and Pamoctan island, is fully one mile wide, deep and clear. The northern

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Chart 3545, plan of Port San Pio Quinto.

entrance, between Pamoctan island and Nagpalbosan point, is fully three-quarters of a mile wide, but there is a rocky patch, with a least depth of 34 feet (10^m4) over it, which nearly breaks in heavy weather, almost in the middle of the channel; when entering by this channel vessels should pass fairly close to Pamoctan island.

A shoal, with a least depth of 16 feet (4^m9) over it, lies about half a mile offshore nearly 2 miles east-north-eastward of Magasasut point.

The best anchorage is about one mile eastward of the south-eastern point of Pamoctan island, in a depth of about 15 fathoms (27^m4), sand and broken coral. The port is exposed to westerly winds, but some protection can then be obtained by anchoring in deep water close eastward of Pamoctan island.

Charts 3804, 3805.

15 Rocks and dangers north-eastward of Camiguin island.—Guinapac (Ginapak) rocks, situated about 6 miles eastward of the northern end of Camiguin island, consist of two rocks like towers, 316 and 215 feet (96^m3 and 65^m5) high, respectively, with another rock, 20 feet (6^m1) high, close northward; foul ground extends northward from the latter rock. A sunken rock, marked by breakers, on which the U.S.S. *Charleston* was wrecked, lies nearly 2 miles northward of the northern Guinapac rock. There is a safe channel between Guinapac rocks and Camiguin island. Heavy tide-rips form in this area.

25 Didikas rock (*Lat. 19° 05' N., Long. 122° 12' E.*), situated about 8 miles north-eastward of Guinapac rocks, is a truncated cone, about 800 feet (243^m8) high, which appeared in 1952 as the result of a volcanic eruption. Formerly there were three rocks, from 200 to 270 feet (61^m0 to 82^m3) high, in this position. This rock, was reported to be still in eruption in November 1953. There are heavy tide-rips in this vicinity.

Chart 3804.

Calayan island.—Off-lying island and dangers.—Anchorages.—Calayan (Kalayan) island lies with Pine point, its southern extremity about 17 miles east-north-eastward of the northern point of Dalupiri island. Mount Calayan (Kalayan), the highest peak, is 1,780 feet (542^m5) high and situated almost in the middle of the island. With the exception of a small cultivated area near the town of Calayan (Kalayan), situated near the south-eastern corner of the island, and Nagsidel and Catanapan (Katanapan) points, on the western side, the island is densely wooded. Nagsidel point lies about 5½ miles south-eastward of Catanapan point, which is the western extremity of the island. The coasts are mostly rocky cliffs, much undermined by the sea, and fringed by a coral reef plainly marked by breakers. Heavy tide-rips are found off the various points, and they should be given a berth of fully one mile when rounding them.

50 The town of Calayan is situated about 2½ miles west-north-westward of Pine point, and near the middle of a sandy beach 4 miles in length. A coral reef, with a rock 8 feet (2^m4) high on it, lies about 1½ miles westward of Pine point and about 6 cables offshore; there is deep water in the fairway of the channel between this reef and the coast. The best anchorage off Calayan is southward of the town, in a depth of 20 fathoms (36^m6), about 4½ cables offshore; boats can land on the beach fronting the town, but this is dangerous with southerly or south-westerly winds. Small vessels can find partly

Chart 3804.

sheltered anchorage in Cibang cove, on the north-eastern side of Pine point. Storm signals are displayed at Calayan; *see* page 27.

Tumulod point lies about 3 miles east-north-eastward of Catanapan point.

Panuitan island, 479 feet (146^m0) high, lies about 2 miles northward of Batang point, the north-eastern point of Calayan island, and rises abruptly from the sea on all sides to a long, even ridge, which is slightly higher at the northern end; the top and eastern sides are covered with grass, and the western slope with small bushes. The island is uninhabited, but is frequently visited by the natives of Calayan island for turtle. A rock, with a depth of three-quarters of a fathom (1^m4) over it, lies about a quarter of a mile off the south-eastern side of Panuitan island. Several pinnacle rocks lie on the shore reef on the north-eastern side of the island.

Wyllie rocks consist of a large black rock, 16 feet (4^m9) high, situated about 2½ miles northward of Panuitan island, and two small rocks, awash, about half a cable north-eastward of the large rock. There are numerous shoals and coral heads within half a mile of the rock. Violent tide rips and whirls occur over this bank even in calm weather, and, owing to the strong and irregular currents, Wyllie rocks should be given a wide berth.

Babuyan island.—Dangers.—Babuyan island, the north-eastern and highest of the group, lies about 23 miles east-north-eastward of Calayan island, and is generally steep-to and wooded. Mount Pangasun (*Lat.* 19° 32' N., *Long.* 121° 57' E.), the highest peak, is situated almost in the middle of the island, and is 3,569 feet (1087^m8) high; a peak, 2,835 feet (864^m1) high, about half a mile westward of Mount Pangasun, is an active volcano, which was observed, in 1951, to be emitting gaseous vapour. Near the western extremity of the island is a conspicuous cinder cone, 2,228 feet (679^m1) high.

The southern extremity of the island is a steep and rocky headland, covered with irregular patches of trees and bushes on its eastern and western sides; a reef extends nearly half a mile south-eastward from this headland, and just within the extremity of this reef is Pan de Azucar, a slender pinnacle rock, 104 feet (31^m7) high.

San Dionisio, the largest settlement, is a small village situated at the mouth of a stream on the south-western coast of the island.

Almost the entire eastern coast of the island consists of cliffs from 200 to 1,400 feet (61^m0 to 426^m7) high. A reef, with two rocks awash on it, extends about 2 cables from the northern point of the island. The best landing place on the island is at Barugan cove, situated on the northern coast, but there is no protected anchorage. Heavy tide-rips occur from one to 3 miles off the various points of the island.

Balintang channel.—Islets and banks.—Balintang channel, between Babuyan and Batan islands, is free from dangers, and is frequently used by vessels proceeding to China and Manila by eastern routes.

Calayan (Kalayan) bank, with a least depth of 19 fathoms (34^m7) over it, lies in the western part of Balintang channel, and extends, with depths of less than 100 fathoms (182^m9), for about 12 miles north-north-westward from a position about 8 miles northward of Panuitan island; there are heavy tide-rips over this bank.

Balintang islets are an isolated group lying in the eastern part

Chart 3804.

of Balintang channel; the western islet, 538 feet (164^m0) high, which is much larger than the others and has four peaks, lies about 25 miles north-north-eastward of the northern point of Babuyan island, and is perforated in a north-east and south-west direction. Within a distance of 6 cables south-eastward of this islet are three islets or rocks, 44, 74, and 117 feet (13^m4, 22^m6, and 35^m7) high, respectively. An islet, 279 feet (85^m0) high, lies about one mile eastward of the large islet, and between them is an islet 339 feet (103^m3) high. These islets may be passed at a distance of from 2 to 3 miles on either side; in bad weather the sea breaks heavily against them.

Banks, with least depths of 85 and 36 fathoms (155^m4 and 65^m8), respectively, are situated about 25 miles west-south-westward and 21 miles west-north-westward of the western Balintang islet (*Lat.* 19° 58' N., *Long.* 122° 08' E.).

Batan islands.—General remarks.—Batan islands, situated in the middle of Luzon strait, are a chain of islands, mostly high, covering a distance of about 53 miles in a north and south direction. The physical characteristics of the larger islands indicate volcanic origin; the smaller islands are generally low, and are based on coral. Earthquakes are frequent, and typhoons are at times extremely severe, in this vicinity.

Sabtang, Batan and Itbayat are the three principal islands, and they are particularly mountainous and well watered by small rivers.

The inhabitants possess many of the characteristics of the native races of Formosa, and their peculiar language increases their exclusiveness; this has been strengthened by the difficulties of intercourse, owing to the strong currents, with Luzon. The chief industry is raising cattle, hogs, horses, and goats, which, owing to their superior quality, are exported in large numbers. The climate of these islands is noted for its salubrity.

Communications.—There is irregular sea communication between Manila and the town of Basco in Batan island, and also with Itbayat island. There is an air service between Basco and Manila.

Tidal streams.—On the rising tide, the tidal stream sets westward into China sea from the Pacific ocean, and in the opposite direction on the falling tide, past and between the islands. At the north-eastern and south-western ends of the group rates up to 5½ knots are attained. Many eddies and races occur near the islands and shoals.

Between Sabtang island and the south-western end of Batan island, the stream sets through the channel at a maximum rate of from 5 to 6 knots, south-eastward on the rising tide, and north-westward on the falling tide. There is a heavy tidal race off the south-eastern entrance on a falling spring tide.

Sabtang island.—Dangers.—Anchorage.—Sabtang, the southernmost island of the group, lies with, Ahau point, its southern extremity, about 42 miles northward of Babuyan island. The island is rugged, and has numerous high steep peaks and serrated ridges. Its summit is 1,115 feet (339^m8) high. Except at a few places where cliffs are at the water's edge, a coral reef fronts the whole coast.

Two rocky ledges lie about 9 cables and 1¼ miles, respectively, northward of Natao point (*Lat.* 20° 22' N., *Long.* 121° 51' E.), the

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Chart 3804.

northern extremity of the island ; the northern ledge has a depth of one fathom (1^m8) over it, and the southern $1\frac{1}{2}$ fathoms (3^m2). Between the latter and Natao point there is a deep channel about half a mile wide.

San Vicente, the principal town, is mostly built of stone and is situated on the north-eastern coast of the island ; the church and other buildings with red roofs and white walls are prominent. Good sheltered anchorage is obtainable off this town during the south-west monsoon, in depths of from 10 to 12 fathoms (18^m3 to 21^m9), sand, with the church bearing 225° ; on this bearing the depths decrease gradually from 15 fathoms (27^m4) about half a mile offshore to about 5 fathoms (9^m1) $1\frac{1}{2}$ cables offshore. The coastal reef extends nearly one cable offshore by the town, but there is a gap in it abreast the church. A bank, with depths of less than 5 fathoms (9^m1) over it, extends about 3 cables offshore at the south-eastern end of the town ; a detached shoal, with a depth of $4\frac{1}{2}$ fathoms (8^m7) over it, lies about $4\frac{1}{2}$ cables east-north-eastward of the church.

Islands westward of Sabtang island.—Anchorage.—Tidal streams.—

Ibuhos (Ibahos) island, situated about one mile westward of Sabtang island, has a hill on its southern end 297 feet (90^m5) high, but is mostly rather low and strewn with lava rocks ; the coastal reef extends as much as half a mile in places from the eastern side of the island. Sabtang channel, separating Ibuhos from Sabtang, is about three-quarters of a mile wide at its narrowest part, between the coastal reefs on either side, and is deep in the fairway. Indifferent anchorage can be obtained in the northern part of this channel, in a depth of about 10 fathoms (18^m3), rocky bottom with sandy patches ; while the tide is rising, the stream sets southward with a maximum rate of from 3 to 4 knots, and while the tide is falling, it sets northward.

Dequey island, situated about half a mile westward of the northern end of Ibuhos island, has a hill on its south-eastern end 202 feet (61^m6) high ; a strong tide-rip sets northward along its south-western side. The channel between Dequey and Ibuhos islands is deep in the fairway ; the coastal reef extends about one cable from either side.

Batan island.—Tidal streams.—Pilots.—Anchorages.—Batan, the most important island of the group, lies north-eastward of Sabtang island, from which it is separated by a deep channel over 2 miles wide, through which the tidal streams run with a rate of 5 to 6 knots, the flood setting south-eastward and the ebb north-westward. Heavy tide-rips are found off the south-eastern entrance to the channel during the ebb stream at springs.

Disiay (Disiai) point (*Lat.* $20^\circ 21' N.$, *Long.* $121^\circ 57' E.$) is situated at the south-eastern extremity of the island. Rocavato (Rokavato) point lies at the northern extremity. Diojo (Dioju) point and Mabatui point are situated on the western coast, about 3 miles west-south-westward and 7 miles south-westward, respectively, from Rocavato point. Tamalung point lies nearly 2 miles southward of Diojo point.

Tumaruk rock, 127 feet (38^m7) high, lies about 2 cables off the north-eastern corner of the island.

The island is mountainous and has some broad cultivated spots. Mount Irada, 3,306 feet ($1,007^m7$) high, apparently an old volcano

Chart 3804.

and thickly wooded, is situated in the north-eastern part of the island; the south-western part of the island rises to an elevation of 1,487 feet (452^m2).

- 5 There are several small towns and villages; Basco, the principal one is situated on the western coast, about 1½ miles south-south-eastward of Diojo point. It is mostly built of stone; the church and other buildings have red roofs and white walls and are prominent from seaward. The eastern coast is practically uninhabited.
- 10 Steamers from Aparri call at Basco and the neighbouring islands. There is no regular pilot. There is a hospital at Basco, and the town has a water system. Supplies are difficult to procure. Storm signals are displayed at Basco; *see* page 27.

- Vessels with local knowledge can obtain anchorage in a bay, off the town of Basco, in a depth of about 13 fathoms (23^m8), fine coral sand; small vessels can anchor closer in, in a depth of 5½ fathoms (10^m1), fine sand. The holding ground is good, but this bay only affords protection in the north-east monsoon. The coastal reef with depths of less than 3 fathoms (5^m5) over it, extends about 1½ cables offshore in places.

- Vessels with local knowledge can obtain open anchorage off Mahatao, a village on the western coast and nearly 1½ miles south-south-westward of Tamalung point. A church tower in Mahatao was reported, in 1951, to be prominent. A passage has been cut through the coastal reef off the village to admit schooners of 50 tons, which are generally hauled up when they arrive from Manila with the south-west monsoon.

- Vessels with local knowledge can obtain anchorage off San Vicente (*Lat.* 20° 23' N., *Long.* 121° 55' E.), situated about 1½ miles southward of Mabatu point, which is the port or landing place for the town of Ivana, about half a mile further south-south-westward; owing to reefs, however, this anchorage is very confined and is unsafe with northerly winds. A church tower in Ivana was reported, in 1951, to be prominent.

- 35 There is anchorage off a village on the southern coast about half a mile westward of Disiay point, in a depth of about 8 fathoms (14^m6), with the church bearing 045°. The church is partly obscured by trees, and only the top is visible.

- Mananiy bay, situated nearly in the middle of the eastern coast, affords sheltered anchorage with westerly winds, but it is impossible to land anything here, as the shore rises vertically to about 150 feet (45^m7).

- Balugan bay, known as Port Contra Costa, the next bay northward of Mananiy bay, affords good sheltered anchorage during the south-west monsoon. Vessels anchor here when it is too rough to call at Basco, which is connected to the landing by road. Desquid point, the southern entrance point of the bay, is a prominent black bluff; there are some high rocks on the coastal reef southward of the point, and foul ground extends for as much as 3 cables offshore between Desquid point and a point lying nearly one mile south-westward. A detached rock, with a depth of less than 6 feet (1^m8) over it, lies about 4 cables south-south-eastward of Desquid point. A pinnacle rock, with a depth of 2 fathoms (3^m7) over it, lies about 1½ cables north-eastward of Desquid point.

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Off-lying banks.—Banks, with least depths of 25 and 69 fathoms (45^m7 and 126^m2), are situated about 6 miles westward of Batan island.

Itbayat island.—**Landings.**—Itbayat island, the largest of the group, lies with its southern extremity about 16½ miles north-westward of Rocavato point, the northern point of Batan island. Mount Santa Rosa, the highest hill on the island, is situated on the northern end and is 914 feet (278^m6) high; Mount Riposet, on the south-eastern side, is 759 feet (231^m3) high. The island presents a barren aspect from seaward, but the interior is well cultivated and there are many wooded patches.

There are four places where landing can be made in suitable weather. On the eastern coast, the landing is about one mile north-eastward of Mount Riposet. There is landing at Mauyen, at the south-western end of the island, and two landings, three-quarters of a mile apart, on the western coast, the northernmost at Mayan (Lat. 20° 48' N., Long. 121° 49' E.).

Diogo island.—**Outlying bank.**—Diogo island, situated about 6½ miles eastward of the southern extremity of Itbayat island, is a volcano rising steeply to an elevation of 1,683 feet (513^m0); in 1903 the volcano was active, discharging vapour and dark material. The island is surrounded by a coastal reef, extending as much as 3 cables in places, and there are several small islets or rocks around; the outermost of these, 75 feet (22^m9) high, lies about half a mile eastward of the south-eastern point, and a rock, 128 feet (39^m0) high, lies about the same distance eastward of the northern point of the island.

A bank, with a least depth of 9 fathoms (16^m5) over it, lies about 5½ miles south-eastward of Diogo island.

Islands and dangers northward of Itbayat island.—**Tidal streams.**—Siayan island, 543 feet (165^m1) high, lies about 3½ miles north-north-eastward of the northern end of Itbayat island; it is surrounded by tide-rips. Foul ground, including rocks above water, extends about a quarter of a mile off its southern and south-eastern sides; one of the rocks is 20 feet (6^m1) high. A shoal, with a least depth of 13 fathoms (23^m8) over it, lies about 1½ miles south-eastward of the island.

Mabudis island, 754 feet (229^m8) high, lies about 1½ miles north-north-eastward of Siayan island, to which it is connected by a shallow ridge, on which there are drying reefs and rocks above water, including two 58 and 83 feet (17^m7 and 25^m3) high, respectively. A reef, with a rock, 60 feet (18^m3) high, near its outer end, extends about half a mile off its northern point.

North island (Lat. 21° 04' N., Long. 121° 56' E.), 881 feet (268^m5) high, lies about 7½ miles northward of Mabudis island. Three rocks, one of them being 135 feet (41^m1) high, lie within 2 cables of the eastern side of North island; a rock above water lies close off its western point, and a rock, 6 feet (1^m8) high, lies about 2 cables north-eastward of its northern point. There are tide-rips off the southern side of the island.

A shoal, with a least depth of 5½ fathoms (10^m5) over it, lies about 4½ miles south-westward of North island; this shoal is a narrow ridge of sand lying in about the middle of the south-western side of a bank, with depths of less than 50 fathoms (91^m4) over it, about 2 miles long in a north-west and south-east direction, and three-quarters of a

Chart 3804.

mile wide. With the exception of this shoal the passage between Mabudis and North islands is clear. The north-going stream commences about 2 hours after the time of low water, and the east-
 5 south-east-going stream about 2 hours after high water. When the moon has a high declination, north or south, these streams occasionally reach a rate of 5 knots. Heavy tide-rips occur near the edge of the bank, except at slack water.

Y'Ami island, 719 feet (219^m1) high, lies about 2 miles north-north-
 10 eastward of North island, and is the northernmost island of the Batan group. An islet, 232 feet (70^m7) high, lies about 3 cables westward of the southern point, and another islet, 30 feet (9^m1) high, lies close off the eastern point of the island. There is a clear channel between Y'Ami and North islands. There are tide-rips and overfalls off the
 15 north-eastern side of Y'Ami island.

A bank, with a depth of 24 fathoms (43^m9) over it, lies about 5 miles north-westward of Y'Ami island, with another bank, with a depth of 29 fathoms (53^m0) over it, between.

Bashi channel.—Dangers.—Banks.—Bashi channel, situated between Y'Ami island and the southern extremity of Formosa is sometimes used by steam vessels trading between the United States, Japan, and Manila. Hsiao-lan hsü (Shōkōtō sho) and Lan hsü (Kōtō sho), lying on the northern side of Bashi channel, and about 42 miles eastward of O-luan pi (Garan bi), the southern point of
 20 Formosa, are described, respectively, on pages 241 and 240, and the light on O-luan pi on page 198.

Chart 3233.

Gadd rock lies about 13 miles southward of Hsiao-lan hsü and in the fairway of Bashi channel; it is about half a cable in diameter,
 30 with a depth of 1½ fathoms (2^m7) over it and deep water close around, increasing to over 100 fathoms (182^m9) close north-eastward of the rock. At low water the sea probably breaks on Gadd rock, but the vicinity is generally marked by violent tide-rips and whirls, which extend more or less the whole distance to Ch'i-hsing chiao (Shichisei
 35 seki), situated about 45 miles westward; as these indications are not always visible, Gadd rock should be given a wide berth on either side.

Charts 3233, 3804.

A bank, marked by heavy overfalls and sometimes by discoloured
 40 water, lies southward of Gadd rock; the least known depth on this bank, 49 fathoms (89^m6), is about 9 miles southward of the rock.

In 1947, a depth of 16 fathoms (29^m3) was reported by the s.s. *China Bear* northward of the bank and about 7½ miles south-south-westward of Gadd rock.

45 Charts 3232, 3233.

Ch'i-hsing chiao (Shichisei seki), situated about 8 miles southward of O-luan pi, (Lat. 21° 54' N., Long. 120° 51' E.), is a group of above water and sunken rocks, the highest being 25 feet (7^m6) high. The channel between these rocks and O-luan pi is safe, but very heavy
 50 tide-rips, extending almost the entire distance across it, are often experienced; these tide-rips sometimes resemble the sea breaking on a shoal.

Chart 3804.

In 1927, the m.s. *Ruhr* reported having observed breakers in a

Charts 1968, 3236, 2661b, 1262, 1263.

Chart 3804.

position about 18 miles south-south-westward of Ch'i-hsing chiao, these breakers were not observed by a vessel, when in the same vicinity in 1940. In 1950, the s.s. *Oregon Mail* reported sighting breakers in a position about 8 miles further south-eastward. 5

Several banks, with depths of less than 50 fathoms (91^m4) over them, lie from 30 to 40 miles southward of Ch'i-hsing chiao. A depth of 35 fathoms (64^m0) was reported in this vicinity by the m.v. *Clytoneus*, in 1951, and a depth of 38 fathoms (69^m5) by the m.v. *Cyclops*, in 1950; a bank, with a least depth of 46 fathoms (84^m1) over it, was reported by the m.v. *Trevaylor*, in 1954. 10

Chart 1968.

FORMOSA.—GENERAL REMARKS.—Formosa or T'ai-wan is a large island lying off the coast of China, from which it is separated by Formosa strait, described on page 178. It is about 210 miles long, north and south, with a maximum width of about 80 miles. Its southern end is nearly 200 miles northward of Luzon, and its northern end is in about the latitude of the southern entrance to Hai-t'an hsia (page 148). The nearest distance to the mainland of China is about 75 miles. 15
20

The island is mountainous, and rises to heights of nearly 13,000 feet (3,962^m4) in places. Generally speaking, the eastern coast is high, and the western coast low.

Caution.—Almost the entire western coast of Formosa is extending seaward and new shoals are continually arising; this is especially the case between An-p'ing chiang (Anpin anchorage) (page 207) and Ta-an chiang (Taian kiang) (page 226). Vessels navigating along this coast should, therefore, give it a wide berth, bearing in mind that there is usually a current setting inshore. 25

Tidal streams.—In general, the tidal streams along the western coast of Formosa set northward with the rising tide in the southern part, and southward with the rising tide in the northern part, but the exact position of the meeting point of these two streams, in opposition to each other with the rising tide, has not been determined, although it appears to be somewhere between Lu-chiang (Rokukō) and Hou-lung (Kōryu) (pages 225 and 227). 30
35

Pilotage.—In 1947, pilotage was compulsory for all vessels including warships, at all ports in Formosa.

Chart 3232.

WESTERN SIDE OF FORMOSA.—O-luan pi to Kao-hsiung chiang.—General remarks.—From O-luan pi (Lat. 21° 54' N., Long. 120° 51' E.), the southern extremity of Formosa, the western coast of the island trends generally north-westward to Kao-hsiung chiang (Takao kō), a distance of about 55 miles. The southern half of this stretch of coast is backed by high land, but the northern half is generally low. 40
45

Charts 3232, 3233.

Nan wan.—Dangers.—Anchorage.—O-luan pi (Garan bi) is a low headland densely covered with scrub and fringed with coral reefs. A rock, 36 feet (11^m0) high, on which the sea breaks heavily in the north-east monsoon, lies close off the eastern extremity of the headland. 50

Charts 3236, 2661b, 1262, 1263.

Charts 3232, 3233.

Nan wan is entered between O-luan pi and a hilly promontory, of which Hei-se chiao (Kokushoku kaku), situated about 7 miles westward of O-luan pi, is the south-eastern extremity. The north-eastern side of the bay is hilly, rising to its highest peak in Ta-shan-mu shan (Toasohambō soan), 1,071 feet (326^m4) high, situated at the head of the bay and nearly 6 miles north-westward of O-luan pi. The shores of the bay are mostly fringed by coral reefs, and there are some sandy beaches at the head.

At the head of Nan wan is Ta-pan-lieh mao-ti (Toapanrā byōchi), which is protected from all but southerly winds and is the best anchorage on the southern side of Formosa.

Yuan-shan pi is a point lying about 4 miles north-westward of O-luan pi. Ch'uan-fan shih and San-chiao-tien are rocks lying close inshore about 1½ miles and half a mile, respectively, eastward of Yuan-shan pi.

Ta-fou-sha (Taifusa), a pinnacle rock with a depth of 4 feet (1^m2) over it, lies about 3 miles eastward of Hei-se chiao and about 6 cables off Yuan-shan pi; a 1½-fathom (3^m2) patch lies about 1½ cables south-westward of Ta-fou-sha, and there are other dangers between Ta-fou-sha and the coast northward.

Shih-niu-tzu (Chogua), situated nearly 1½ miles north-westward of Ta-fou-sha and 1½ cables off Shih-niu pi, is a rock 12 feet (3^m7) high, and foul ground extends about 1½ cables south-eastward from it. Ta-lao-ku, situated nearly 1½ miles north-eastward of Hei-se chiao and about 4 cables off the western shore of the anchorage, is a rock 8 feet (2^m4) high; a rock, one foot (0^m3) high, lies nearly 1½ cables southward of Ta-lao-ku, with a submerged rock between. There is foul ground between these two rocks and the western shore of the bay. A rock, with a depth of 17 feet (5^m2) over it, lies nearly 4 cables north-eastward of Ta-lao-ku.

Fu-sha, a rock which dries one foot (0^m3), lies about half a cable southward of Hei-se chiao, and a rock, with a depth of less than 6 feet (1^m8) over it, lies about one cable north-eastward of this point.

Ta-pan-lieh (Toapanrā) is a small village at the head of the bay and is the base of a whaling company.

Lights.—A light is exhibited, at an elevation of 179 feet (54^m6), from a white circular iron tower, 72 feet (21^m9) in height, situated on O-luan pi (*Lat.* 21° 54' N., *Long.* 120° 51' E.).

A light is exhibited, at an elevation of 34 feet (10^m4), from a white mast, 25 feet (7^m6) in height, situated on the shore close westward of Ta-pan-lieh. This light shows *green* between the bearings of 007° and 059° over the dangers on the western side of the bay, *red* between the bearings of 278° and 325° over the dangers on the eastern side, and *white* in the approach to the anchorage. This light was reported to be extinguished in 1947.

Chart 3232.

Coast.—Danger.—Anchorage.—Mao-pi t'ou (Nyopii tā) is situated about three-quarters of a mile westward of Hei-se chiao and is the south-western point of Formosa; the coast in this vicinity is fringed with coral reefs, and the mountains rise in steep precipices almost directly from the sea. The tidal streams are strong and there are tide races off this promontory.

Pai-sha pi (Hakusha bi), situated about 1½ miles north-westward

Charts 3804, 1968, 3236, 2661b, 1262, 1263.

Chart 3232.

of Mao-pi t'ou, is the northern entrance point of Pai-sha chiang (Hakusha kō), a small bay with a white sandy beach, which affords shelter to small craft with local knowledge with offshore winds; a rock, with a depth of 17 feet (5^m2) over it, lies about half a mile southward of Pai-sha pi and 3 cables offshore. On the northern side of Pai-sha chiang is a hill 407 feet (124^m0) high. Hsün-kuang-tsui (Jinkoshi), situated about 3 miles northward of Pai-sha pi, is a small cove where boats can land.

Ta-p'ing-ting chiao (Daiheichō kaku) is a rounded, black, cliffy headland situated about 2½ miles north-north-westward of Hsün-kuang-tsui, and the coastal range of hills rises here to an elevation of 645 feet (196^m6); within this range, and about 2 miles inland, is a flat plain running from north to south, so that Ta-p'ing-ting chiao appears as an island when seen from northward. Beyond this plain is a range of mountains rising to an elevation of 2,224 feet (677^m9) in Lao-fu shan (Rōbutsu san), a flat summit with three peaks, situated about 6 miles eastward of Ta-p'ing-ting chiao (*Lat.* 22° 02' N., *Long.* 120° 41' E.).

Heng-ch'un (Kōshun), the principal town in the southern part of Formosa, is situated in the plain mentioned above and had a population of 14,404, in 1935.

Hou-wan-tzu (Kowanshi) is a small bay immediately northward of Ta-p'ing-ting chiao; reefs extend from the shores on either side, leaving an entrance barely half a cable wide leading to a small basin, with depths of from one to 5 fathoms (1^m8 to 9^m1), which affords anchorage for small craft with local knowledge. Kuei shan (Kisan), a dome-shaped hill 241 feet (73^m5) high, is situated on the northern side of Hou-wan-tzu; Kuei-shan chiao (Kisan kaku) is the western extremity of Kuei shan.

Ch'e-ch'eng po-ti.—Anchorage.—Ch'e-ch'eng po-ti (Shajō hakuchi) is a roadstead fronting a level tract of land with a sandy beach, between Kuei shan and Ch'e-ch'eng chiao (Shajō kaku), situated nearly 2 miles northward; Ch'e-ch'eng chiao is a sandy point, covered with grass, and fringed by a coral reef which extends about 1½ cables westward and is usually marked by surf. There are depths of from 6 to 7 fathoms (11^m0 to 12^m8) about half a mile offshore, shoaling gradually towards the land; the bottom is sandy in general, mixed here and there with mud. The anchorage is entirely exposed to westerly winds, but affords shelter from winds between north-east and south, through east. Boats can land on the sandy beach, but as there is usually a heavy surf, caution must be exercised.

Pao-li ch'i (Horyoku kei) flows out immediately northward of Kuei shan, and Ch'e-ch'eng ch'i (Shajō kei) flows out about half a mile further northward; these two rivers bring down a considerable amount of silt when in flood. The village of Ch'e-ch'eng (Shajō) is situated on the northern bank of Ch'e-ch'eng ch'i and about 4 cables up this river.

Hai-k'ou wan.—Aspect.—Dangers.—Hai-k'ou (Kaikō) wan is entered between Ch'e-ch'eng chiao and a point situated about 1½ miles north-north-eastward, on which is a sugarloaf hill 414 feet (126^m2) high, named Chien shan (Sensan). The southern side of the bay is low, but about 2 miles east-north-eastward of Ch'e-ch'eng chiao is the southern end of a range of mountains which extends for

Charts 3804, 1968, 2661b, 1262, 1263.

Chart 3232.

about 6 miles northward from this position. Li-lung shan (Riiryon soan), the summit of this range, is 3,500 feet (1,066^{m8}) high, and is situated about 3½ miles north-north-eastward of Chien shan; it is
 5 thickly wooded, shaped like a nipple, and is an excellent landmark when not obscured by clouds. Wen-chao shan (Buntaku san), lying about 2½ miles southward of Li-lung shan, is a prominent, sharp peak, 2,322 feet (707^{m7}) high.

Reefs extend about 3 cables north-westward and northward from
 10 Ch'e-ch'eng chiao, so this point should be given a wide berth when entering the bay. Shui-keng (Suikō) sha, a reef with a least depth of 3 feet (9^{m0}) over it, lies nearly midway between Ch'e-ch'eng chiao and Chien shan, and a detached reef, with a depth of 3½ fathoms (6^{m9}) over it, lies close off its northern end; there is a clear passage
 15 between these two reefs and the head of the bay and also between Shui-keng sha and the reefs extending from Ch'e-ch'eng chiao (*Lat. 22° 05' N., Long. 120° 42' E.*).

The village of Hai-k'ou (Kaikō) is situated in the south-eastern corner of the bay, and off the village is a fishing harbour formed by
 20 a breakwater on the western side and a sea wall on the eastern side, the basin thus enclosed having a depth of 8 feet (2^{m4}).

Light.—Beacons.—Anchorage.—A light is exhibited, at an elevation of 43 feet (13^{m1}), from a white square concrete tower, 40 feet (12^{m2}) in height, situated on the extremity of the breakwater at
 25 Hai-k'ou. A white square concrete tower surmounted by a diamond, 41 feet (12^{m5}) in height, known as beacon "A", stands on the slopes of the hills 4 cables east-south-eastward of the light-tower; these two towers in line, bearing 112°, lead between the reefs extending from Ch'e-ch'eng chiao and Shui-keng sha.

30 A red square concrete tower with a triangular topmark, 26 feet (7^{m9}) in height, stands on a hillock about a quarter of a mile within Ch'e-ch'eng chiao and is known as beacon "B." There is anchorage, in a depth of about 4½ fathoms (8^{m2}), approaching on the leading mark just given, and anchoring when beacon "B" bears 202°. At
 35 night the reefs extending from Ch'e-ch'eng chiao and Shui-keng sha are covered by *red* sectors of Hai-k'ou light between the bearings of 063° and 090°, and 133° and 170°, respectively; the channel between these reefs is covered by a *white* sector.

Coast.—Anchorage.—The village of Feng-chiang (Fūkō) is situated
 40 about 5 miles northward of Chien shan and on the southern side of the mouth of Feng-chiang ch'i (Fūkō kei), which is too small even for boats to enter; the hills around are densely wooded. Ya yen (A gan), a rock 19 feet (5^{m8}) high, lies close inshore about 2 miles southward of Feng-chiang.

45 The villages of La-t'ung-chiao (Raitōkyaku) and Fang-shan (Bōzan) are situated on the southern and northern sides, respectively, of the mouth of Fang-shan ch'i (Bōzan kei), which flows into the sea about 4½ miles north-north-westward of Feng-chiang; this river rises in the central range of mountains and has usually but little
 50 water in it, but after a fall of rain it becomes a raging torrent. The hills along the whole of this part of the coast rise abruptly from the sea, but about 3 miles northward of Fang-shan (*Lat. 22° 16' N., Long. 120° 39' E.*) the coast turns north-westward at the foot of a mountain 1,759 feet (536^{m1}) high, whilst the mountains continue

Charts 3804, 1968, 2661b, 1262, 1263.

Chart 3232.

northward, leaving a broad plain between them and the sea.

Lu-mang-ch'i-kou pi (Sotsubōko bi) lies about $5\frac{1}{2}$ miles north-north-westward of Fang-shan; Lu-mang ch'i (Sotsubō kei) flows out at Lu-mang-ch'i-kou pi, but its entrance dries in winter. A white concrete bridge over the entrance to this river is prominent. 5

Fang-liao (Bōryō) is a small town situated on the coast about 7 miles north-north-westward of Fang-shan; it can be identified by a remarkable square clump of trees on the beach about one mile southward of the town. Fang-liao Chiang (Bōryō kō), the anchorage off the town, affords the best shelter, for vessels with local knowledge, on the western coast of Formosa except that off Kao-hsiung, and even in winter it is possible to remain here in safety. A few provisions are obtainable. The town is unhealthy, and dysentery, malaria, and beri-beri are prevalent. 15

Hsin-ta Chiang (Shinta kō) is a shallow boat harbour lying just within the mouth of Lin-pien ch'i (Rinpei kei); its narrow entrance lies about 5 miles north-westward of Fang-liao, but even at high water only small boats can enter.

Off-lying island.—Caution.—Liu-ch'iu hsü (Ryūkyū sho) is a well-populated island lying about $11\frac{1}{2}$ miles westward of Fang-liao; it has two flat-topped hills on its south-eastern side, the north-eastern, 291 feet (88^m7) high, being slightly the higher of the two. In 1947 the island was reported to lie about $1\frac{1}{2}$ miles north-westward of its charted position. 25

There is a sandy beach about half a mile long in the middle of the south-eastern coast of the island, and temporary anchorage can be obtained here by vessels with local knowledge, in a depth of 20 fathoms (36^m6), sand, about $3\frac{1}{2}$ cables offshore. There is a light on the north-western side of the island, but the depths are too great for anchoring; there is a landing place for boats here near a white house. A rock, 26 feet (7^m9) high, resembling a mushroom, lies close off the northern point of the island, and is prominent when seen from eastward or westward. There is a white sandy beach at the north-eastern extremity of the island which is prominent. Shoal water extends from the north-eastern end of Liu-ch'iu hsü, and this end of the island should be given a berth of one mile. 35

A small harbour, enclosed by three breakwaters, has been constructed on the north-eastern side of the island.

There is a remarkable depression in the bed of the sea between Liu-ch'iu hsü and the coast of Formosa northward; this deep area is a gully, from a half to one mile wide, running first eastward from seaward and then turning northward towards the coast near Tung-chiang (Tōkō). In one part of it, about $2\frac{1}{2}$ miles northward of Liu-ch'iu hsü, no bottom has been found at nearly 350 fathoms (640^m1). 45

Lights.—A light is exhibited, at an elevation of 286 feet (87^m2), from a white circular concrete tower, 36 feet (11^m0) in height, on the south-eastern side of Liu-ch'iu hsü (*Lat.* 22° 20' N., *Long.* 120° 22' E.).

A light is exhibited, at an elevation of 28 feet (8^m5), from a red concrete column, 23 feet (7^m0) in height, on the head of the north-western breakwater. 50

Tidal streams.—Between Liu-ch'iu hsü and the Formosa coast northward the tidal streams appear to set south-eastward with the rising tide, and north-westward with the falling tide, the maximum

Charts 3804, 1968, 2661b, 1262, 1263.

Chart 3232.

rate varying from one to 2 knots. Off the western coast of Liu-ch'iu hsü, however, the tidal stream has been frequently observed setting northward with the rising tide, but the surface stream and the stream
5 near the bottom run in contrary directions; although at times these two may run in the same direction, the rate of the stream near the bottom is generally double that of the surface stream.

Off the south-western and north-eastern extremities of Liu-ch'iu hsü the tidal streams are strong, attaining a rate of from 2 to 3 knots
10 and causing tide-rips. There are also tide-rips immediately southward of the deep area previously described.

Tung-chiang po-ti.—Anchorage.—Tidal streams.—Tung-chiang po-ti (Tōkō hakuchi) is the roadstead off the entrance to Tung-chiang ch'i (Tōkō kei), which has its source in the central mountain range of
15 Formosa, runs southward through a fertile plain, and flows into the sea about $10\frac{1}{2}$ miles north-westward of Fang-liao; the mouth of this river is the harbour of Tung-chiang (Tōkō), but its importance is gradually waning and the number of large Chinese junks using it is decreasing. Earth and sand brought down by the rush of water
20 from Tung-chiang ch'i, in addition to that from Hsia-tan-shui ch'i (Shimo Tansui kei), which flows out nearly one mile north-westward, has gradually accumulated and obstructs the passage of shipping. There is a depth of barely one foot (0^m3) on the bar; about 3 cables offshore the depths increase suddenly, and within the space of half a
25 mile the depths increase from 10 fathoms (18^m3) to over 50 fathoms (91^m4).

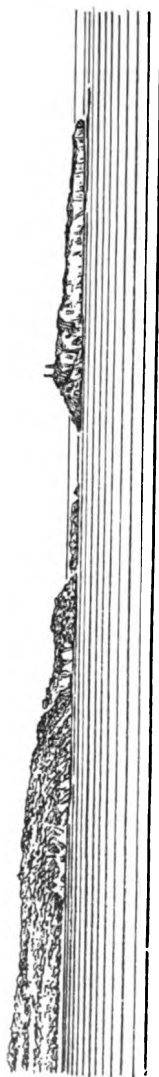
Owing to the considerable depths off the mouth of Tung-chiang ch'i vessels must anchor southward of the entrance. The best position is in a depth of about $5\frac{1}{2}$ fathoms (10^m1), with a black wood with trees
30 about 41 feet (12^m5) high, situated on the coast nearly $1\frac{1}{2}$ miles south-eastward of the mouth of the river, bearing 090° , distant nearly $1\frac{1}{2}$ miles. With the black wood bearing between 078° and 100° , distant from one to $1\frac{1}{2}$ miles, there are depths of from 5 to 7 fathoms (9^m1 to 12^m8), and shelter can be obtained with north-easterly
35 winds all over this area. The tidal streams in this anchorage have a maximum rate of about one knot.

The town of Tung-chiang (Tōkō) is situated on the southern bank of the river and just within the entrance. The landing place is below the bridge at the southern end of the town, and boats can land here
40 at any state of the tide. There is a local storm signal station in the town.

Coast.—Shan-wei pi (Senbi bi) is a low, sandy spit situated about $2\frac{1}{2}$ miles westward of the mouth of Tung-chiang ch'i; shoal water extends about 3 cables southward from this spit, and there are
45 generally breakers.

Feng-pi t'ou (Hōbi tō) is a rocky point, 80 feet (24^m4) high, situated about 3 miles north-westward of Shan-wei pi, and there is a small rock, 2 feet (0^m6) high, close off the point. Feng-pi t'ou (*Lat.* $22^\circ 30' N.$, *Long.* $120^\circ 21' E.$) rises north-eastward to a hill named
50 Feng shan (Hōzan), 478 feet (145^m7) high, situated about $1\frac{1}{2}$ miles inland and shaped like the head of a bulrush: a prominent saddle-shaped hill 258 feet (78^m6) high, named Feng-kuei shan (Hōkai san), lies between Feng-pi t'ou and Feng shan, and is said to resemble two factory chimneys when seen from northward or south-eastward.

Charts 3804, 1968, 2661b, 1262, 1263.



Entrance. Ch'i-hou-shan Lt. Ho.
130°, 6 cables. Brakwater.

Kao-hsiung chiang from north-westward.
(Originals dated 1921).

Chart 3232.

From a position about $1\frac{1}{2}$ miles north-westward of Feng-pi t'ou a narrow strip of sand, on which are bushes and fishermen's huts, extends about $6\frac{1}{2}$ miles north-westward and encloses a lagoon. A prominent chimney, 140 feet (42^m6) high, stands inland from the south-eastern end of the lagoon.

Chart 2376, plan of Kao-hsiung chiang.

KAO-HSIUNG CHIANG.—**General remarks.**—Kao-hsiung chiang is one of the two major ports of Formosa, the other being Chi-lung chiang (Keelung harbour) (page 223), on the northern coast. 10

The port consists of an inner and an outer harbour. The town of Kao-hsiung and the harbour works are situated at the north-western end of the lagoon described above, the northern part of which has been dredged; the southern part of the lagoon remains shallow and undeveloped. A considerable amount of silting occurs, 15 and the charted depths cannot be relied upon.

The inner harbour is protected and safe in any weather. The port is available for vessels up to 10,000 tons.

The climate is hot, but not unbearably so. North-westerly winds prevail throughout the year, although southerly winds occur in summer. Typhoons occur without much warning between June and 20 October.

Charts 2409, 3232.

Dumping ground.—A dumping ground for ammunition, indicated by pecked lines on the chart, lies from $3\frac{1}{2}$ to 6 miles westward of the 25 entrance to Kao-hsiung chiang.

Chart 2376, plan of Kao-hsiung chiang.

Entrance.—**Breakwaters.**—**Outer harbour.**—Ch'i-hou shan is the north-western extremity of the narrow strip of sand which forms the south-western side of the lagoon, and its seaward side is composed 30 of precipitous cliffs; its southern extremity is called Saracen chiao.

The entrance to the inner harbour lies between the northern extremity of Ch'i-hou shan (*Lat. $22^{\circ} 37' N.$, Long. $120^{\circ} 15' E.$*) and a low point situated about three-quarters of a cable northward, and is protected from seaward by two breakwaters, which enclose the 35 outer harbour. The southern breakwater extends north-westward from under an old fort on Ch'i-hou shan, and the northern breakwater extends west-south-westward from the coast nearly half a mile northward of the northern entrance point. See view facing this page. The entrance to the outer harbour is about 2 cables wide 40 between the breakwater heads.

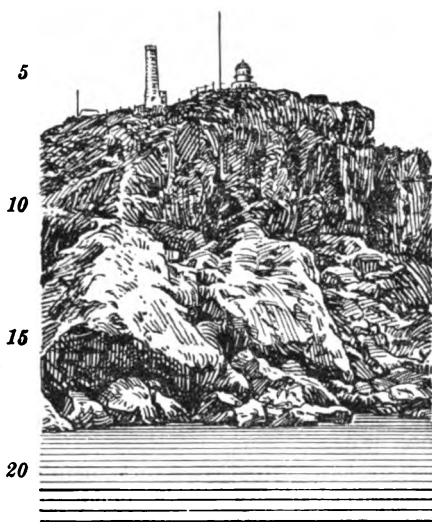
A bank, with depths of less than 3 fathoms (5^m5) over it, extends about 2 cables off the southern side of the southern breakwater with its north-western extremity about one cable westward of the outer 45 end of the breakwater.

Shou (Kao-hsiung) shan, situated nearly $1\frac{1}{2}$ miles northward of the entrance to the inner harbour, is a useful landmark, and is described on page 206.

Shoal in the approach.—**Buoy.**—A shoal of some extent, with depths of from 29 to 36 feet (8^m8 to 11^m0) over it, lies about half a 50 miles westward of the entrance to the outer harbour.

A buoy marks the 6-fathom (11^m0) line about 6 cables north-westward of the outer end of the northern breakwater.

Charts 1968, 2661b, 1262, 1263.

Chart 2376, plan of Kao-hsiung chiang.

*Ch'i-hou-shan lighthouse.
bearing 220°, three-quarters of a cable.
(Original dated 1921).*

Lights.—A light is exhibited, at an elevation of 47 feet (14^m3), from a red circular concrete tower, 43 feet (13^m1) in height, on the head of the southern breakwater.

A light is exhibited, at an elevation of 49 feet (14^m9), from a white circular concrete tower, 45 feet (13^m7) in height, on the head of the northern breakwater.

A light is exhibited, at an elevation of 190 feet (57^m9), from a white octagonal brick tower, 50 feet (15^m2) in height, situated on the northern and highest part of Ch'i-hou shan. There is a tower close to this lighthouse. *See view.*

A single light and two pairs of lights, each pair disposed vertically, are exhibited on the southern side of the harbour entrance

about half a cable north-north-westward, and half a cable and three-quarters of a cable east-north-eastward, respectively, of the light on Ch'i-hou shan.

A single light, and two lights, disposed vertically, are exhibited on the northern side of the inner harbour entrance.

Anchorage.—Mooring buoys.—The outer anchorage is situated northward and north-westward of the breakwaters in depths of from 4 to 10 fathoms (7^m3 to 18^m3), sand. This anchorage is entirely open and exposed.

Anchorage is available for small vessels in the outer harbour clear of the entrance channel in depths of 12 to 25 feet (3^m7 to 7^m6).

There are some mooring buoys in the outer harbour.

Inner harbour.—Entrance channel.—Danger.—Depths.—Buoys.—

Wharves and basins.—The inner harbour is entered through a dredged channel, 360 feet (89^m7) wide, which was reported, in 1951, to have a depth of 30 feet (9^m1). A rock, with a depth of 16 feet (4^m9) over it, lies close inshore on the southern side of the entrance. It is reported that a vessel drawing 29 feet (8^m8) entered the port in 1949.

The town of Shao-ch'uan is situated on the northern side of the entrance, and close eastward of it are two basins for the use of small craft. The Custom house and Port offices are situated on the western side of the western of the above basins. There is a signal station at Shao-ch'uan.

A large dredged basin is situated on the northern side of the inner harbour, about 1½ miles inside the entrance; into it flows Kao-hsiung ho. A submerged pipe-line is laid across the entrance to this basin.

The main wharf lies between the above basin and the basins for small craft inside the northern side of the entrance. Other wharves and reclamations are under construction south-eastward of the basin.

Charts 2409, 3232, 1968, 2661b, 1262, 1263.

Chart 2376, plan of Kao-hsiung chiang.

The town of Ch'i-hou lies on the southern side of the entrance. Built-up areas extend for about one mile from the entrance point, and are fronted by wharves and basins for the use of small craft. A ferry service operates across the harbour between Ch'i-hou and Kao-hsiung. 5

The inner harbour has been dredged for a distance of about $1\frac{1}{2}$ miles from its entrance. It was reported, in 1947, that the depth in the fairway and alongside the main wharfs was 26 feet (7^m9). It was reported, in 1950, that the depth at the southern row of mooring buoys was 28 feet (8^m5). 10

The edges of the shoal banks in the inner harbour are marked in places by conical buoys.

Mooring buoys.—There are a number of mooring buoys in the inner harbour; their positions can best be seen from the chart. 15 Ships at buoys moor head and stern and are discharged by lighters.

Pilots.—The Pilotage area and harbour limits of Kao-hsiung chiang are within a radius of 2 miles from Ch'i-hou-shan lighthouse (*Lat.* 22° 37' N., *Long.* 120° 15' E.). Vessels should not attempt to enter without a pilot. 20

Traffic signals.—The following signals are exhibited from the signal station at Shao-ch'uan :—

- (a) Three *red* lights, disposed in a triangle, indicates that vessels may leave the harbour.
- (b) Three *green* lights, similarly disposed, indicates that vessels 25 may enter the harbour.

Tidal streams.—The tides have a large diurnal inequality at Kao-hsiung chiang, and often there is only one tide a day. At the harbour entrance the tidal stream on the rising tide sets into the harbour, and that on the falling tide runs out, both turning at the 30 times of high and low water and attaining a rate of from 2 to 3 knots. Outside the harbour the tidal stream sets southward with the rising tide, and northward with the falling tide, both being weak and subject to considerable diurnal inequality.

The tidal stream sets through the entrance channel to the inner 35 harbour at a maximum rate of from 2 to 3 knots, turning at the times of high and low water.

The best time to enter the harbour is at the end of the flood stream.

Cables.—Two submarine cables are laid across the harbour, just within the entrance. See page 37. 40

Harbour facilities.—**Supplies.**—It has been reported that the port will provide berthing accommodation for 21 vessels of from 3,000 to 10,000 tons on completion of construction work about the end of 1948.

In 1949, the depths at berths alongside varied from 18 to 27 $\frac{1}{2}$ feet (5^m5 to 8^m3). 45

There is a small graving dock on the western side of the entrance to the dredged basin at the entrance to Kao-hsiung ho. Two floating docks were in use in 1950. There are two patent slips for vessels of moderate size, and a number of others for smaller craft and boats. For the dimensions of the largest dock, see Appendix I, page 706. 50

There are workshops and marine engine works, but repair facilities were reported, in 1949, to be negligible.

It was reported, in 1949, that 3 tugs and 2 dredgers were in use, and that there were about 40 lighters.

Chart 2376, plan of Kao-hsiung chiang.

The main wharves are connected to the railway system.

Oil fuel is available. Water is laid on the main wharves, but could only be supplied by boat in 1949.

5 **Deratisation.**—See page 37.

Storm signals.—Local storm signals are displayed from the signal station at Shao-ch'uan.

Town.—The town of Kao-hsiung is situated on flat ground on the northern side of the Inner harbour. In 1950, the population was
10 275,600.

Charts 2409, 3231, 3232.

WESTERN SIDE OF FORMOSA.—Kao-hsiung chiang to Wai-sheng chiao.—**General remarks.**—From Kao-hsiung chiang (Takao kō) the coast trends about 66 miles northward to Wai-sheng chiao (Gaijō kaku), and is uniformly low. Shoals extend some distance off the northern part of this stretch of coast, which forms the eastern side of Pescadores channel.

Charts 2409, 3232.

Coast.—Danger.—Shou shan (Kotobuki yama or Takao san), 1,174
20 feet (357^m8) high, situated nearly 1½ miles northward of the entrance to Kao-hsiung chiang and nearly half a mile inland, is composed of coral and has a crater-like summit; on northerly bearings it appears like a truncated cone, and there is a large white patch on its seaward side. In clear weather it can be seen from a distance of 35 miles, when
25 it appears like an island, and it is the best landmark in this locality.

Ryder yen (rock), which dries one foot (0^m3), lies westward of Kao-hsiung shan and about 1½ cables offshore.

Tso-ying chiang.—Anchorage.—Tso-ying chiang (harbour), entered about 3 miles northward of Shou shan (*Lat.* 22° 39' N., *Long.* 120° 15' E.), is an artificially constructed harbour on the shores of a shallow lagoon, and is only partially completed. It was commenced by the Japanese shortly before the 1941-45 war, and was designed as a Naval base. It has no commercial significance.

The entrance is through a dredged channel between two small
35 breakwaters. There was a depth of 24 feet (7^m3) in the entrance channel in 1946, but silting is prevalent.

The harbour is enclosed, and protected from all winds. The climate is similar to that of Kao-hsiung chiang.

Works were reported to be in progress in the harbour in 1949.

40 The port is connected to the railway system by a branch line to Kao-hsiung.

Anchorage is available outside the breakwaters and about one mile offshore in depths of from 5 to 6 fathoms. It is not recommended except with offshore winds.

45 **Coast.**—The coast between Tso-ying chiang and An-p'ing (Anpin), situated about 19 miles northward, is an almost straight sandy beach, through which some small streams flow, but they are only navigable by boats. Close within this beach are lagoons or marshes, separated from the sea by narrow sandbars, which in places are
50 thickly covered with shrubs and grass; these sandbars are populated by fishermen, whose rafts, hauled up in rows on the beach, form a characteristic feature of this coast. The mainland itself is low, flat, and marshy, but is cultivated. See view on chart 2409.

Charts 1968, 2661b, 1262, 1263.

Charts 2409, 3232.

Pan-p'ing shan (Poanpen san or Whaleback), situated about 4 miles north-eastward of Shou shan, is 780 feet (237^m7) high. Hsiao-kang shan (Shōkō san or Shokan soan), lying nearly 7½ miles northward of Pan-p'ing shan (*Lat. 22° 42' N., Long. 120° 18' E.*), is 815 feet (248^m4) high and has a flat summit. Ta-kang shan (Daikō san or Toakan soan), 1,021 feet (311^m2) high, lying about 1½ miles further northward, is conical and lies at the southern end of a long range of flat-topped hills; these two hills are generally visible when the mountains in the interior are obscured. T'a-ti shan (Ruitei san or Coast Table) is a flat-topped hill, 165 feet (51^m3) high, lying about 7 miles northward of Shou shan and about one mile inland.

A large black chimney, with a white band, and a white house near it, situated about 5 miles south-eastward of An-p'ing, is reported to be a useful mark.

Chart 2409.

An-p'ing chiang.—Harbour limits.—Anchorage.—Tidal streams.—An-p'ing chiang consists of an open anchorage opposite the town of An-p'ing. The harbour limit is the arc of a circle with radius of 2 miles and centre at An-p'ing lighthouse (*see below*). During the height of the north-east monsoon, from December to March, there is smooth, sheltered anchorage, in a depth of about 5 fathoms (9^m1), with An-p'ing lighthouse bearing between 039° and 059°. During the remainder of the year, however, when south-westerly winds prevail, the anchorage is untenable at times, and communication with the shore is entirely suspended.

The town of An-p'ing lies about one mile inland, on the shore of a shallow lagoon which has an outlet to the sea, but is not navigable even by small craft. The eastern side of this lagoon, northward of the outlet, is formed by a sandy island.

An-p'ing (*Lat. 23° 00' N., Long. 120° 09' E.*) is the port of T'ai-nan, the oldest and second largest town in Formosa, which lies about 2 miles further inland. The country round An-p'ing is low-lying, a considerable portion being swampy and submerged at high water, with extensive salt pans northward and southward of the town. A chimney, 94 feet (28^m7) high, situated in the town is prominent.

An-p'ing is reached by a canal, navigable by junks and small craft only, which is entered about one mile south-eastward of the outlet to the lagoon. The canal entrance is protected by two breakwaters, and has been dredged to a depth of 6 feet (1^m8). A continuation of this canal connects An-p'ing with T'ai-nan.

The tidal streams in the anchorage are weak, setting southward on the rising tide and northward on the falling tide. The diurnal inequality is large.

Lights.—A light is exhibited, at an elevation of 77 feet (23^m5), from a white circular brick tower, 17 feet (5^m2) in height, situated near the middle of the town of An-p'ing. The lighthouse is not conspicuous, as it is partially obscured by trees and houses.

A light is exhibited, at an elevation of 31 feet (9^m4), from a white circular concrete structure, 27 feet (8^m2) in height, on the head of the northern breakwater.

A light is exhibited, at an elevation of 32 feet (9^m8), from a red circular concrete structure, 27 feet (8^m2) in height, on the head of the southern breakwater.

Charts 1968, 2661b, 1262, 1263.

Chart 2409.

A light is exhibited, at an elevation of 31 feet (9^m4), from a white triangular wooden structure, 22 feet (6^m7) in height, situated on the sandy island on the northern side of the outlet to the lagoon and about 1½ miles westward of An-p'ing lighthouse. This light was reported to be extinguished in 1945.

Harbour facilities.—Communications.—Ships at anchor in the roadstead are discharged by junk, lighter, or the local native bamboo raft known as "Teppai," which is particularly suitable for lighterage on this open coast.

There is ample berthing accommodation for small craft at both An-p'ing and T'ai-nan.

Fresh provisions are obtainable. Water is supplied by water boat.

T'ai-nan (*Lat.* 22° 59' N., *Long.* 120° 12' E.) is connected to the railway on the western side of Formosa.

Storm signals.—Local storm signals are displayed at An-p'ing.

Coast.—An-p'ing to Wai-sheng chiao.—General remarks.—The coast between An-p'ing and Wai-sheng chiao, situated about 42 miles northward, consists mainly of a sandy beach which dries out for a considerable distance in places, and within the beach is a level plain, intersected by numerous small streams; the seaward edge of the beach is fringed in places by sand cays, mostly narrow and from 2 to 10 feet (0^m6 to 3^m0) high. See caution on page 197. Owing to the absence of landmarks, it is difficult to fix a vessel's position off this coast.

Coast.—Dangers.—Tidal streams.—Beacons.—Storm signals.—Ts'eng-wen ch'i (Sofunke) flows into the sea about 6 miles north-westward of An-p'ing, and is about 2 cables wide at its mouth, which lies between sand dunes. Between the island forming the eastern side of the lagoon at An-p'ing and the mouth of Ts'eng-wen ch'i, is a sand dune named Hai-liao, which has numerous fishermen's huts on it and a prominent dark wood at its northern end; T'u-ch'eng chou (Dojō su), a sandbank with a least depth of 4 feet (1^m2) over it, which breaks heavily with southerly winds, extends about 1½ miles westward from Hai-liao.

Nan-p'ing-o is a sand cay on the northern side of the entrance to Ts'eng-wen ch'i. The entrance to Kuo-sheng Chiang (Kokushin kan), the outlet of several streams which unite and form a channel through the sandbanks forming the coast, lies between Nan-p'ing-o and the south-eastern end of Chung-ho, a narrow sand cay lying about a quarter of a mile north-westward; the masts of numerous junks are usually to be seen in this locality. Strong westerly or southerly winds produce such a high sea that it is impossible for boats to enter Kuo-sheng Chiang. The approaches to Kuo-sheng Chiang are encumbered with drying sand banks, on one of which there is a small sand cay.

For a distance of about 15 miles northward of Nan-p'ing-o, the coast is fronted by a series of long narrow sand cays lying from one to 3 miles offshore with drying flats between intersected by a number of streams. Hu-liao (Oryo), the southernmost of these cays, is 10 feet (3^m0) high, and lies close north-westward of Chung-ho, with detached sand cays extending about one mile from its southern end.

Toahyan tui (Toahyantai) is a sandy shoal with a least depth of 2½ fathoms (5^m0) over it, lying about one mile westward of the

Charts 1968, 2661b, 1262, 1263.

Chart 2409.

southern end of Hu-liao, and is the outermost danger in this vicinity ; on the outer side of this shoal the tidal streams set northward with the rising tide, at a maximum rate of about 2 knots, and southward with the falling tide, the streams turning at the time of high and low water at the entrance to Kuo-sheng chiang ; i.e. about $1\frac{1}{2}$ hours after high and low water at Hong Kong (Admiralty Tide Tables Standard Port). 6

Men-k'ou-shan (Monkausoa), 5 feet (1^m5) high, is the sand cay next northward of Hu-liao. Ch'ing-kun-shen (*Lat.* $23^\circ 11' N.$, *Long.* $120^\circ 05' E.$), an islet inhabited by fishermen and a frequent place of call for small junks, lies about $1\frac{1}{2}$ miles south-eastward of the northern extremity of Men-k'ou-shan. Portions of the flats within Hu-liao and Men-k'ou-shan have been reclaimed, and works are in progress. Ho-liao (Uryo) is a narrow sand cay lying with its southern extremity about 2 cables northward of the northern end of Men-k'ou-shan. 15

Chiang-chün ch'i has its outlet between the northern end of Ho-liao and the southern end of Hsiao-sha-liao (Shōseiryō), the next sand cay northward ; junks proceed up this river to load salt and there is a junk anchorage near its entrance. There is a small town on the southern side of the entrance to this river. 20

A beacon, surmounted by a black spherical daymark, 39 feet (11^m9) high, is situated off the northern end of Ho-liao, and marks the entrance to Chiang-chün ch'i. A beacon consisting of a square tower, 67 feet (20^m4) high, painted in white and black horizontal bands and surmounted by a pole with black conical topmark, is situated on the northern entrance point of Chiang-chün ch'i. 25

Wang-yeh chiang (Onya kan) is a junk harbour in the lower reaches of Chi-shui ch'i, which has its outlet between Hsiao-sha-liao and Hai-shan chou (Kaisen su), a long, narrow sand cay lying about $1\frac{1}{2}$ miles northward ; this harbour can only be entered with smooth water. The town of Pei-men (Pakumensutsum), situated on the mainland about $1\frac{1}{2}$ miles eastward of the northern end of Hsiao-sha-liao, is a centre of the salt industry. 30

Pu-tai chiang (Chiyen kan) is a small harbour lying about 6 miles northward of Wang-yeh chiang and off the town of Pu-tai (Potei) ; the harbour entrance faces northward and there are long, narrow sand cays on each side. The harbour is difficult to enter when the monsoon is strong. The least depth in the channel leading to the town is barely one foot (0^m3). Pu-tai po-ti is the roadstead off Pu-tai chiang. Pu-tai (*Lat.* $23^\circ 23' N.$, *Long.* $120^\circ 09' E.$) had a population of over 4,900 in 1931. Local storm signals are displayed on the western side of the town. 35 40

Light.—A light is exhibited, at an elevation of 63 feet (19^m2), from a white circular concrete tower with black stripes, 56 feet (17^m1) in height, near the southern end of the eastern side of Hu-liao. In 1946 this light was reported extinguished. 45

Cables.—There are two submarine cables, indicated on the chart, from Pu-tai to Pescadores islands, and vessels are warned not to anchor in their vicinity ; see page 37. 50

Off-lying shoals.—Ko-ch'eng chou (Katsuragi su), situated about 9 miles south-westward of Pu-tai, is a sandbank with a least depth of $3\frac{1}{2}$ fathoms (5^m9) over it.

Wai-hsing (Gahia), lying about 7 miles westward of Pu-tai, is a

Chart 2409.

narrow sandbank with a least depth of 4 feet (1^m2) over it, on which the sea usually breaks. Nei-kou (Raikau), lying about midway between Wai-hsing and the entrance to Pu-tai chiang, is a sandbank
 5 with a least depth of 2½ fathoms (4^m1) over it; there is shoal water northward of Nei-kou, and a few patches with depths of less than 3 fathoms (5^m5) over them.

Less water was reported, in 1951, about 2 miles south-westward of Nei-kou.

- 10 **Directions.**—Vessels proceeding to Pu-tai chiang from westward and passing through Pescadores channel must take care not to be set on to Liu-ch'ih chiao (Rokushaku shō), described on page 201, by the north-going current and the tidal streams; course may then be shaped to pass midway between Ko-ch'eng chou and Wai-hsing.
 15 Vessels can safely approach up to a distance of 2 miles of the coast near Pu-tai.

There are few landmarks in this vicinity by which a vessel can fix her position, and due consideration must be paid to the effect of the currents and tidal streams; it must be recognised that navigation at night is very difficult. If the visibility is poor owing to
 20 rain, fog, or mist, the change in the colour of the water generally gives some indication of the change in depth.

- Tung-shih chiang.**—**Storm signals.**—Tung-shih chiang (Tanchau kan) is situated about 4½ miles northward of Pu-tai and on the
 25 northern side of the mouth of P'o-tzu ch'i. Nan-shan tao (Namusoa to) is the southern of three sandbanks sheltering an area off the town of Tung-shih where junks anchor. The anchorage is approached through narrow channels on either side of Nan-shan tao, but only junks with a draught of less than 6 feet (1^m8) can enter. Local
 30 storm signals are displayed at Tung-shih (*Lat.* 23° 27' N., *Long.* 120° 09' E.).

A white circular water tower, 115 feet (35^m0) in height, is situated about 5½ miles eastward of Tung-shih and is prominent from seaward.

- Coast.**—**Dangers.**—**Anchorage.**—**Storm signals.**—Wen-chiang sha-tui (Onkan tai) is a large bank extending about 10 miles south-westward from a position on the coast about 11 miles northward of
 35 Tung-shih; the inner part is composed of mud, and the outer part of sand, and the greater part of it dries. The outer edge of this bank is marked by two sand cays, T'ung-hsien chou (Gwasowan) and
 40 Wai-san-ting chou (Pinboisoa), about 23 and 12 feet (7^m0 and 3^m7) high, respectively. Wai-san-ting chou, the southernmost, lies about 6½ miles offshore, and from it shoal water extends southward to within about 2 miles of Wai-hsing, with Ta-pai (Tappe), a drying
 bank, and a number of shoals with depths of less than one fathom
 45 (1^m8) over them, near its southern edge. Less water was reported, in 1932, in the channel between the southern edge of the shoal water and Wai-hsing.

- Po-tzu-liao shan, consisting of two sand cays, 2 feet (0^m6) and one foot (0^m3) high, respectively, and San-chiao-chao-tzu shan, a sand
 50 cay above water, are situated inside Wai-san-ting chou (*Lat.* 23° 31' N., *Long.* 120° 02' E.).

Wen chiang (On kan) is a narrow, shoal creek lying between the eastern side of the southern end of Wen-chiang sha-tui and the sandbanks extending from the mainland eastward, and it affords anchor-

Chart 2409.

age for junks and small craft ; the village of Hsin-chiang (Shinkan), where local storm signals are displayed, is situated on the main coast abreast the head of the creek.

Light.—A light is exhibited, at an elevation of 70 feet (21^m3), 5 from a white circular concrete structure, 69 feet (21^m0) in height, situated on the southern sand cay of Po-tzu-liao shan. In 1946 this light was reported to be destroyed.

Off-lying shoals.—Wen-chiang ch'ien-lai (Onkan sendan) is a sandbank, with a least depth of one fathom (1^m8) over it, lying about 1½ 10 miles south-westward of Wai-san-ting chou ; it is marked by breakers during the south-west monsoon. Wai-ling-tzu (Goaren-a) is another sandbank, with a least depth of 1½ fathoms (3^m2) over it, lying about 2¼ miles west-north-westward of Wai-san-ting chou. Both these sandbanks are steep-to on their western sides, and they form the 15 most dangerous part of the eastern side of Pescadores channel.

Charts 2409, 3231.

Hai-k'ou po-ti.—**Anchorage.**—Hai-k'ou po-ti (Kaikō hakuchi or Haipo road) lies off the mouth of Hsin-hu-wei ch'i (Kyūkōbi kei), which flows into the sea about 15 miles northward of Tung-shih by 20 a mud point named Wai-sheng chiao (Gaijō kaku), which is situated about 12 miles north-north-eastward of the light-structure on Po-tzu-liao shan ; it is the only roadstead off the central part of the western coast of Formosa which has not deteriorated owing to the silt brought down from the rivers during floods. The coast for nearly 5 miles 25 southward of Wai-sheng chiao consists of sand hills from 15 to 25 feet (4^m6 to 7^m6) high. Sandbanks, which dry, extend about 3 miles from the coast northward of Wai-sheng chiao, and shelter the anchorage from north-eastward ; Hai-feng tao (Sasaki shima), a sandy islet 4 feet (1^m2) high, with some fishermen's huts on it, is 30 situated near the outer edge of the drying sandbanks and about 3 miles north-north-westward of Wai-sheng chiao (*Lat.* 23° 42' N., *Long.* 120° 10' E.).

A shoal, with a least depth of 16 feet (4^m9) over it, lies about 3 miles westward of Wai-sheng chiao and forms a natural breakwater 35 to vessels lying inside it. During the north-east monsoon there is good anchorage here, in depths of from 4 to 5 fathoms (7^m3 to 9^m1), mud, with Wai-sheng chiao bearing about 066°. Caution is necessary when approaching the anchorage, as in recent years the banks and shoals have extended southward. 40

Tai-hsi (Kaikō or Haipotsutsun) is a village on the mainland about one mile eastward of Wai-sheng chiao.

Light.—A light is exhibited, at an elevation of 72 feet (21^m9), from a watch tower, 65 feet (19^m8) in height, on Hai-feng tao. This light was reported to be extinguished, in 1945. 45

Chart 1961.

PESCADORES ISLANDS AND CHANNEL.—**General remarks.**—Pescadores islands, also known as P'eng-hu ch'ün-tao, separated from the western coast of Formosa by Pescadores channel, consist of many islands and numerous rocks. The geological formation of these 50 islands is mainly a mixture of basalt and sandstone, with outcrops of quartz on the extreme western shores. The islands are generally flat, no part exceeding an elevation of 260 feet (79^m2), and, as they

Charts 1760, 1968, 2661b, 1262, 1263.

Chart 1961.

are very similar in appearance, it is difficult to identify any of them in bad weather ; there are no trees.

Pescadores islands are divided into two main groups, separated by
 5 a channel named Pa-chao chiang-tao (Hattō suidō). The largest islands P'eng-hu tao (Hōko tō), Yü-weng tao (Gyoō tō), and Pai-sha tao (Hakusa tō), are contained in the northern group ; these three islands enclose the extensive and excellent harbour P'eng-hu chiang (Hōko kō). The islands in the southern group are mostly of a
 10 reddish colour.

The climate resembles that of the southern parts of Formosa ; frost and snow never occur in winter. Though rain seldom falls in summer, in which respect the climate differs from that of southern Formosa, the weather is humid and sultry in that season. As the
 15 islands are not sufficiently high to afford protection, the wind is always felt strongly ; however calm the early part of the day may be, a wind is practically certain to arise after noon, generally from north-north-east from October to April, and southerly from May to September.

20 The north-east monsoon is very strong from the middle of September to the beginning of April ; during this period the sky is generally overcast, but very little rain falls. At other times of the year there are only light winds ; in summer light southerly winds are frequent and the weather is generally good. Typhoons sometimes occur
 25 between July and September. Fogs may occur between January and May, and these are most frequent in March, but they are few in comparison with those on the opposite coast of China.

The population of the islands was reported, in 1947, to be 70,000.
Chart 2409.

30 **Pescadores channel.**—Pescadores channel, also known as P'eng-hu chiang-tao, separates Pescadores islands from the western coast of Formosa, and is deep in the fairway. Liu-ch'ih chiao (*Lat.* 23° 29' N., *Long.* 119° 45' E.) and several other dangers lie on the western side of the northern part of the channel, eastward of P'eng-hu tao ; these
 35 are described on page 219. The principal dangers on the eastern side are Wen-chiang ch'ien-lai and Wai-ling-tzu (page 211). The utmost caution must be exercised at all times when navigating this channel.

The coast on the eastern side of Pescadores channel, in the vicinity
 40 of Pu-tai, consists of sand hills dotted with low trees and houses, with no conspicuous landmarks, and even in clear weather the land cannot be distinguished from a distance of more than 10 miles ; owing to the dust which accompanies the winds peculiar to this locality, objects on shore become obscured, and at times the land cannot be seen
 45 even at a distance of 5 miles.

With strong winds or a heavy sea the shoals on the eastern side of the channel are generally indicated by breakers, but in calm weather they are not easy to discern owing to the muddy colour of the water. Vessels making use of this channel should always keep in depths
 50 of over 20 fathoms (36^m6) ; on the eastern side the depths decrease very rapidly within that depth. In the neighbourhood of Pu-tai the bottom consists of fine sand covered with a layer of mud several inches deep. When the tidal streams are strong, or there is a heavy sea, the areas in which the depths are less than 10 fathoms (18^m3)

Charts 1760, 1968, 2661b, 1262, 1263.

Chart 2409.

become yellowish and muddy, whilst those of greater depth are a mixture of yellowish muddy colour and light blue water ; in depths of over 30 fathoms (54^m9) the water is of a deep indigo colour.

Tidal streams and currents.—According to observations carried 5 out during the summer in Pescadores channel, the tidal streams set northward with the rising tide, that is in the same direction as Kuro shio, and southward with the falling tide ; the north-going stream may thus attain a considerable rate, whilst the south-going stream is sometimes imperceptible. The rate of Kuro shio is 10 considerably increased by continuous south-westerly winds, and is reduced by north-easterly winds ; consequently, after a spell of south-westerly winds the north-going stream at spring tides may attain a maximum rate of about 5 knots.

On the western side of the channel the tidal streams change about 15 one hour after the times of high and low water at Pu-tai (*Lat.* 23° 23' N., *Long.* 120° 09' E.) ; i.e. 3 hours before high and low water at Sungai Sarawak (Admiralty Tide Tables Standard Port). On the eastern side, at a position about one mile westward of Wai-ling-tzu, the north-going stream during summer changes over to the south- 20 going stream at 2 hours after high water at Pu-tai ; i.e. 2 hours before high water at Sungei Sarawak. Although the maximum rate of the north-going stream is about 4½ knots, that of the south-going stream is very weak.

In the middle of the channel the current only is apparent, setting 25 northward at a maximum rate of from 2 to 4 knots ; in the northern part of the channel, and outside a distance of from 7 to 8 miles off-shore, this rate is only from one to 2 knots. Between 3 to 4 miles off-shore and 7 to 8 miles offshore the surface movement of the water is compounded of both the current and the tidal streams. On the 30 western side of the channel, northward of Liu-ch'ih chiao, the tidal streams are felt up to a distance of from 5 to 6 miles offshore ; southward of Liu-ch'ih chiao they are in evidence westward of the line joining this rock and Tung-chi hsü (Tōkichi sho).

According to various reports, during the winter when strong north- 35 north-easterly winds occur, there is frequently a strong drift setting southward, but this does not appear to be felt southward of Tung-chi hsü.

Chart 1961.

Chi-mei hsu.—**Dangers.**—**Off-lying banks.**—Chi-mei hsü (Dai sho), 40 the southernmost of Pescadores islands, rises to its highest summit 213 feet (64^m9), in the south-eastern part, and when seen from northward or southward appears wedge-shaped ; this island is well cultivated, and had a population of 3,716 in 1930.

P'i-tzu wei (Moyankyan), the north-western point of the island, is a 45 low tongue of land fringed by a reef about 2 cables wide, with depths of less than 3 fathoms (5^m5) over it ; the outer edge of this reef is steep-to, and there are always whirlpools off it. Chinese junks find good shelter off the northern side of P'i-tzu wei during the summer months. A bank, with depths of from 5½ to 10 fathoms (10^m1 to 18^m3) over it, extends about 2 miles northward from a position about 1½ miles north-north-westward of P'i-tzu wei ; tide-rips always occur 50 on this bank.

Kuo-lung-tzü (*Lat.* 23° 11' N., *Long.* 119° 26' E.), the southern

Charts 1760, 1968, 2661b, 1262, 1263.

Chart 1961.

point of the island, is a pointed headland ; a rock, with a depth of 3 fathoms (5^m5) over it, lies 2 cables southward of this point, and there are always tide-rips around it. There is foul ground off the coast for
 5 about three-quarters of a mile north-westward of Kuo-lung-tzü. Kan shih (Kentaa) is a pinnacle rock, with a depth of 2½ fathoms (4^m1) over it, lying about three-quarters of a mile north-eastward of Kuo-lung-tzü and about 3 cables offshore ; a rocky bank, with depths of from 8 to 10 fathoms (14^m6 to 18^m3) over it, lies about one mile
 10 east-north-eastward of Kuo-lung-tzü.

Ting-i (Takyaataa), the north-eastern point of the island, is a steep, prominent cliff about 200 feet (61^m0) high ; shoal water extends for about half a mile eastward of Ting-i, terminating in a steep-to rock, with a depth of 5½ fathoms (10^m1) over it.

15 Banks, with depths of less than 10 fathoms (18^m3) over them, lie from a half to 1½ miles off the northern side of Chi-mei hsü, with a shoal of 5½ fathoms (9^m6) situated about one mile north-north-westward of Ting-i.

Light.—A light is exhibited, at an elevation of 133 feet (40^m5), from
 20 a white circular concrete tower, 23 feet (7^m0) in height, on Kuo-lung-tzü. In 1946 this light was reported to have been destroyed.

Mao hsü and Ts'ao hsü.—**Banks and dangers.**—Mao hsü (Daibyō sho), situated about 8 miles north-westward of P'i-tzu wei, is a prominent dome-shaped island 256 feet (78^m0) high ; close eastward
 25 of it is an island 194 feet (59^m1) high. Ts'ao hsü (Sō sho) is a flat island, 59 feet (18^m0) high, lying with its northern point nearly one mile eastward of Mao hsü. The channel between Mao hsü and Ts'ao hsü is shallow and obstructed by rocks above water, leaving only a passage for boats ; a reef extends about three-quarters of a mile
 30 south-south-eastward from Ts'ao hsü, and on its outer end is a small rock 15 feet (4^m6) high. A 6½-fathom (12^m3) shoal lies about one mile southward of the above rock, and banks, with depths of from 8 to 10 fathoms (14^m6 to 18^m3) over them, lie from a half to 1½ miles southward of Mao hsü.

35 **Hua hsü.**—**Banks and dangers.**—**Light.**—Hua hsü (Ka sho), situated about 4½ miles northward of Mao hsü (*Lat.* 23° 19' N., *Long.* 119° 19' E.), is mainly composed of quartz, and is thus fairly easy to indentify from a distance ; the island is irregular in appearance, and its highest hill is 180 feet (54^m9) high. A small bay on the
 40 north-eastern coast of the island affords shelter from southerly winds to small craft with local knowledge. A village, with a population of about 500 in 1930, is situated on the southern coast ; there is but little cultivation.

A reef, with some rocks above water, extends about 1½ cables from
 45 the south-eastern point of Hua hsü, and a shoal, with a least depth of 3½ fathoms (5^m9) over it, lies about 3 cables from the south-western point of the island. A sandy spit, with general depths of less than 10 fathoms (18^m3) over it, extends about 1½ miles southward from the island, with isolated patches of similar depth for one mile further in
 50 the same direction.

A light is exhibited, at an elevation of 212 feet (64^m6), from a white circular concrete structure, 41 feet (12^m5) in height, on the summit near the south-western extremity of Hua hsü.

Chiao lieh-tao.—**Dangers.**—Chiao lieh-tao (Shō rettō) is a group con-

Charts 1968, 2661b, 1262, 1263.

Chart 1961.

sisting of two islands and a number of rocks. Tung-hsü-p'ing hsü (Tōshohei), the southern island, lies about 4 miles north-eastward of Chi-mei hsü and is 197 feet (60^m0) high ; there are sandy beaches on its western and southern sides. A rock, 28 feet (8^m5) high, lies 1½ cables off its south-eastern point, and a shoal, with depths of less than 5 fathoms (9^m1) over it, extends about one mile south-eastward from this rock. A pinnacle rock, with a depth of 2½ fathoms (4^m1) over it, lies fully half a mile eastward of the north-eastern point of Tung-hsü-p'ing hsü.

Chu-mu chiao (Flat rock), 20 feet (6^m1) high, lies about 2 miles south-eastward of Tung-hsü-p'ing hsü ; a pinnacle rock, with a depth of 4 fathoms (7^m3) over it, lies about half a mile south-south-eastward, and a rock, with a depth of 4 feet (1^m2) over it, lies about 4 cables south-westward, of Chu-mu chiao. There are always strong tide-rips about here. Chung-tzu (Peaked rock), a prominent square rock 120 feet (36^m6) high, lies nearly 1½ miles westward of Chu-mu chiao, and is steep-to on all sides except the eastern. Nan-wen-tzu (Low rock), lying about 1½ miles westward of Chung-tzu, is a flat, steep-to rock 6 feet (1^m8) high. A rock, 82 feet (25^m0) high, lies about 6 cables west-north-westward of the south-western point of Tung-hsü-p'ing hsü, with foul ground between.

Hsi-hsü-p'ing hsü, 148 feet (45^m1) high, lies close north-westward of Tung-hsü-p'ing hsü and is connected to it by a sandy ledge ; a rock, 75 feet (22^m9) high, with two rocky pillars on it, lies about 2 cables off its north-western point.

T'ou-chin hsü (Steeple islet), (*Lat.* 23° 17' N., *Long.* 119° 30' E.), situated about one mile north-north-westward of Hsi-hsü-p'ing hsü, is a prominent rock 157 feet (47^m8) high, with some rocks off its southern side. A rocky shoal, with a least depth of 5½ fathoms (10^m1) over it, lies about three-quarters of a mile north-westward of T'ou-chin hsü, and a 8-fathom (14^m6) patch lies about 1½ miles further in the same direction.

Hsi-chi hsü and Tung-chi hsü.—Islet and dangers.—Banks.—Caution.—Hsi-chi hsü (Seikitsu sho), 98 feet (29^m9) high, lies about 5 miles eastward of Tung-hsü-p'ing hsü and has cliffs on its northern side ; a village, with a population of about 360 in 1930, is situated on its southern side. Pei chiao, a rock 6 feet (1^m8) high, lies about 1½ cables off its northern coast. Foul ground extends about three-quarters of a mile eastward from Hsi-chi hsü, and Kintaa, a rock which dries one foot (0^m3), lies nearly half a mile north-eastward of the north-eastern point of the island ; about 3 cables eastward of Kintaa is a rock with a depth of 3 feet (0^m9) over it, and about 3 cables further eastward is a rock with a depth of 1½ fathoms (2^m3) over it. A bank, with a least depth of 8 fathoms (14^m6) over it, lies about half a mile northward of Kintaa.

Tung-chi hsü (Tōkichi sho), situated about 2½ miles eastward of Hsi-chi hsü, is saddle-shaped, with the highest point, 154 feet (46^m9) high, in the north-western part ; there are sand dunes on the eastern and western sides, and some rocks lie close offshore. A village, with a population of 900 in 1930, is situated on the western side of the island. An islet, 118 feet (36^m0) high, named Ch'u-t'ou hsü, lies about 3 cables off the north-western end of Tung-chi hsü and is connected to it by a reef ; a rock, with a depth of 5 fathoms (9^m1) over it, lies about

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6 cables north-westward of Ch'u-t'ou hsü, and about 3 cables west-south-westward of this rock is a rock with a depth of $5\frac{1}{2}$ fathoms (9^m6) over it. A bank, with a least depth of $6\frac{1}{2}$ fathoms (12^m3) over it, lies nearly midway between Hsi-chi hsü and the southern end of Tung-chi hsü.

Both Hsi-chi hsü and Tung-chi hsü are surrounded by shoal water for a distance of from one to 4 cables; strong tide-rips off the salient points are a danger to small craft. The passage between these two islands should not be attempted, as the rocks just described, and strong tide races, render it highly dangerous.

A rocky bank, with a least depth of 11 fathoms (20^m1) over it, and on which there are tide-rips, lies about 4 miles east-north-eastward of Tung-chi hsü.

15 **Light.**—A light is exhibited, at an elevation of 220 feet (67^m1), from a white circular concrete tower, with black bands, 66 feet (20^m1) in height, situated on the northern side of Tung-chi hsü.

T'ou-chin Chiang-tao.—**Dangers.**—T'ou-chin Chiang-tao (Tōgun suidō), situated between T'ou-chin hsü and Pa-chao lieh-tao (Hattō rettō), a group of islands lying northward, is nearly 4 miles wide, but the navigable channel is reduced to half this width by a bank, on which are a number of rocks, extending about 2 miles southward from Pa-chao lieh-tao; the southern part of the channel is deep, except for the $5\frac{1}{2}$ and 8 fathom (10^m1 and 14^m6) patches lying north-
25 westward of T'ou-chin hsü (*Lat.* 23° 17' N., *Long.* 119° 30' E.), and previously described.

T'ou-chin-tu-ch'ien (Iwasaki shō), a rock with a depth of $2\frac{3}{4}$ fathoms (5^m0) over it, lies nearly 2 miles northward of T'ou-chin hsü and is the southernmost of the dangers in the northern half of T'ou-
30 chin Chiang-tao. Chung-chien (Yoshino shō), a rock with a depth of less than 6 feet (1^m8) over it, lies about 6 cables north-north-eastward of T'ou-chin-tu-ch'ien; several sunken rocks lie within about half a mile eastward and south-eastward of Chung-chien, and patches of $2\frac{3}{4}$ and $4\frac{1}{2}$ fathoms (5^m0 and 8^m7) lie, respectively, about 6 cables
35 north-north-eastward and west-north-westward of it. This area should be avoided, especially as the tidal streams are strong.

Pa-chao lieh-tao.—**Banks and dangers.**—**Anchorage.**—Pa-chao lieh-tao (Hattō rettō) is a group consisting of Pa-chao tao (Hattō tō) and Chiang-chun-ao hsü (Sō tō), with numerous islets and rocks.
40 The inhabitants live mainly by fishing.

Pa-chao tao, the main island of the group, attains its greatest elevation in a dome-shaped hill, about 171 feet (52^m1) high, on the western side of the island, on the summit of which is a large stone pillar. There are three villages on the island, situated on the southern,
45 western and northern coasts, respectively.

Shoal ground extends about half a mile off the southern side of Pa-chao tao, and a $4\frac{1}{2}$ -fathom (8^m2) rock lies nearly three-quarters of a mile southward of its south-western point.

Lung-wen (Paun), a rock 7 feet (2^m1) high, lies on a reef about 4
50 cables westward from the south-western point of Pa-chao tao. Pei-wen (Nanun), 7 feet (2^m1) high, situated about one mile westward of Lung-wen, is the western of three rocks, above water, contained in a group of drying reefs. These drying reefs are separated from Lung-wen by a channel about half a mile wide, which has depths of

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from 4 to 8 fathoms (7^m3 to 14^m6) in its centre, but which should only be used by small vessels with local knowledge. Men-k'ou-wen (Munkaun shō), a rock, 4 feet (1^m2) high, lies on a reef about a quarter of a mile from the centre of the western coast of the island. Hsi-tung wei (Seidobi) is the north-western point of Pa-chao tao. Banks with depths of less than 10 fathoms (18^m3) over them, are situated, respectively, about $1\frac{1}{2}$ and $3\frac{1}{2}$ miles westward of Hsi-tung wei. Shui-an (Tsuiuan) wan lies between Hsi-tung wei and Tung-pi t'ou (Tampiitau), the north-eastern point of Pa-chao tao. Reefs extend nearly 3 cables from the northern coast, and a rock 5 feet (1^m5) high, named Ch'uan-hu chiao, lies about 4 cables east-north-eastward of Tung-pi t'ou. Ma-an-shan hsü (Cliff islet), 69 feet (21^m0) high, lies about 2 cables offshore about one mile south-eastward of Tung-pi t'ou, and a $5\frac{1}{2}$ -fathom (10^m5) patch lies about 2 cables eastward of Ma-an-shan hsü.

Chiang-chun-ao hsü, 92 feet (28^m0) high, is separated from the eastern coast of Pa-chao tao by a narrow passage named Chiang-chun Chiang-tao (Shōgun suidō), described below; a village (*Lat.* $23^{\circ} 22' N.$, *Long.* $119^{\circ} 31' E.$) is situated on the western side of the island. Drying reefs, with some rocks above water on them, extend for half a mile in places off the northern coast of the island. Ch'uan fan hsü (Senpan sho), the south-eastern point of the island, is a steep black cliff, 108 feet (32^m9) high, and is a very good landmark. Shoal ground extends up to half a mile in places off the southern coast of Chiang-chun-ao hsü, and Tu-ti-tzu, an islet 30 feet (9^m1) high, lies about half a mile south-westward of Ch'uan-fan hsü. Ch'uan-fan-hsü-wen (Tsununsūtaa), situated about half a mile eastward of Chuan-fan hsü, is a rock, 7 feet (2^m1) high, on the southern side of a group of partly drying reefs. A bank, with depths of less than 10 fathoms (18^m3) over it, lies about one mile north-north-eastward of Chuan-fan-hsü-wen. A $2\frac{1}{2}$ fathom (4^m1) patch lies about 7 cables south-eastward of Ch'uan-fan hsü, and about half a mile further in this direction is Hao-pao-chien-wen (Kōhei shō), a group of dangerous shoals with a rock, which dries, on its western side. Ta-wen (Waaun-taa), a rock 9 feet (2^m7) high, lies on the western side of another group of dangerous shoals situated about one mile southward of Ch'uan-fan hsü. Vessels should not attempt to pass between Ch'uan-fan-hsü-wen, Hao-pao-chien-wen, and Ta-wen, as there are many pinnacle rocks in this vicinity.

Chiang-chun Chiang-tao (Shōgun suidō), separating Pa-chao tao and Chiang-chun-ao hsü, is narrow and intricate and can only be used by small vessels with local knowledge; the tidal streams are rapid. Rocks, 3 and 10 feet (0^m9 and 3^m0) high, respectively, lie on the eastern edge of partly drying reefs off the south-eastern corner of Pa-chao tao, and mark the western side of the southern entrance channel to Chiang-chun Chiang-tao.

During the north-east monsoon there is anchorage, in depths of from 6 to 8 fathoms (11^m0 to 14^m6), sand, off the western coast of Pa-chao tao, between Lung-wen and Men-k'ou-wen. In the south-west monsoon there is anchorage off the eastern side of Pa-chao tao, between Ma-an-shan hsü and Ch'uan-hu chiao, in depths of from 9 to 10 fathoms (16^m5 to 18^m3), sand and mud.

Tidal streams.—In the vicinity of the islands composing the southern

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group of Pescadores islands the tidal streams set northward on the rising tide and southward on the falling tide, the change occurring within one hour after high or low water; the maximum rate is between 3 and $4\frac{1}{2}$ knots, but this is considerably affected by the monsoon currents.

Pa-chao chiang-tao.—Pa-chao chiang-tao (Hattō suidō), the channel separating the northern from the southern group of Pescadores islands, is about 5 miles wide, and appears to be deep and free from dangers.

Hu-ching hsü and Tung-p'an hsü.—**Dangers.**—Hu-ching hsü (Kosei sho), 193 feet (59^m3) high, the southernmost island of the northern group of Pescadores islands, lies about $5\frac{1}{2}$ miles northward of Pa-chao tao and is flat-topped and consists of two parts, connected by a low sandy isthmus, so that from a distance northward or southward it appears as two islands; except for the sandy isthmus the coasts of both parts consist of steep cliffs. O-tou pi (*Lat.* $23^\circ 30' N.$, *Long.* $119^\circ 32' E.$) the eastern extremity of the island, is a sharp headland with steep cliffs, and is a good landmark. A village, with a population of about 800 in 1930, is situated on the isthmus. A bank, with a least depth of 7 fathoms (12^m9) lies about three-quarters of a mile southward of Hu-ching hsü.

T'ung-p'an hsü (Tampoan su) is a flat-topped island, 78 feet (23^m8) high, lying about one mile northward of Hu-ching hsü. A spit, with depths of from 3 feet (0^m9) to 3 fathoms (5^m5) over it, extends about $1\frac{1}{4}$ miles north-westward from the island.

Shoals, with depths of 8 and 5 fathoms (14^m6 and 9^m1) over them, lie, respectively, about one mile eastward and north-eastward of T'ung-p'an hsü, near the centre of the channel between this island and P'eng-hu tao.

Cable.—A submarine cable is laid between the eastern end of Hu-ching hsü and Yuan-ting (Yencho) wan in P'eng-hu tao. See page 37.

P'eng-hu tao.—**General remarks.**—P'eng-hu tao (Hōko tō), the largest of Pescadores islands, is 151 feet (36^m0) high and of very irregular shape; it lies with Tieh chiao (Pon kaku), its south-western extremity, about $2\frac{3}{4}$ miles eastward of T'ung-p'an hsü. Chung-t'un hsü, 46 feet (14^m0) high and Pai-sha tao (Hakusa tō) are connected to the northern side of P'eng-hu tao by a reef, which dries, so that at low water, these three islands appear as one; Liao-wang wei (Hoku to), the northern point of Pai-sha tao, is 126 feet (38^m4) high.

These three islands form the eastern side of P'eng-hu chiang, described on page 221. The western side of P'eng-hu tao encloses the harbour of Ma-kung chiang (Bakō kō), described on page 222.

P'eng-hu tao.—**Southern coast.**—**Dangers.**—**Anchorages.**—Li-cheng chiao (Risei kaku), the eastern extremity of P'eng-hu tao, is low and shelving. Cha-p'o hsü (Saha sho) lies about $1\frac{1}{4}$ miles eastward of Li-cheng chiao, with foul ground between, and is a rocky islet 57 feet (17^m4) high; a pinnacle rock with a depth of 2 fathoms (3^m7) over it, lies about one mile south-eastward of Li-cheng chiao, and a reef, partly awash, lies about one mile southward of the same point. There are whirlpools in this locality, and it must be avoided.

Between Li-cheng chiao (*Lat.* $23^\circ 33' N.$, *Long.* $119^\circ 41' E.$) and Hou chiao (Kō kaku), situated about $5\frac{1}{2}$ miles south-westward, the

Charts 2409, 1760, 1968, 2661b, 1262, 1263.

Chart 1961.

coast recedes and forms a bay, where anchorage may be obtained during the north-east monsoon. There are fishing villages along the shore of this bay. Lin-shou chiao (Rinto shō), a rock with a depth of $2\frac{1}{2}$ fathoms (4^m6) over it, lies about $2\frac{1}{2}$ miles south-westward of Li-cheng chiao; Hsiang-lu hsü (Kōro sho), a rock 5 feet (1^m5) high, with other rocks around, lies about one mile northward of Lin-shou chiao. Between these rocks and the coastal reef extending from the south-western side of Li-cheng chiao there are depths of from 6 to 8 fathoms (11^m0 to 14^m6), mud and sand, where sheltered anchorage can be obtained in the north-east monsoon, taking care to avoid the submarine cable (*see below*); the water is very clear, and the rocks and shoals can be plainly seen from the masthead.

From Hou chiao the coast trends westward for about 2 miles to Tieh chiao, and then generally north-westward for about $2\frac{1}{2}$ miles to the eastern entrance point to P'eng-hu chiang. Yuan-ting (Yencho) wan, a bay situated close north-westward of Tieh chiao, affords excellent anchorage in a depth of about 6 fathoms (11^m0); at the head of this bay is a low neck of land, separating it from Ma-kung chiang (page 222), and the sea sometimes washes over it at high water when there is a wind from seaward.

Cables.—A submarine cable from Pu-tai, situated on the western coast of Formosa, is landed on the western side of Li-cheng chiao.

For the submarine cable between Yuan-ting wan and Hu-ching hsü, *see* page 218. *See* page 37.

Islets and dangers south-eastward of P'eng-hu tao.—Liu-ch'ih chiao (Rokushaku shō), the outermost of these, lies nearly 6 miles south-eastward of Li-cheng chiao and has a depth of 3 feet (0^m9) over it; close off its southern side is a rock with a depth of $4\frac{1}{2}$ fathoms (8^m2) over it. These rocks are steep-to, but they are plainly marked by tide-rips when there is any tidal stream running.

Nan shih (shō), with a depth of $2\frac{1}{2}$ fathoms (4^m6) over it, lies about $2\frac{1}{2}$ miles south-south-eastward of Li-cheng chiao, and is the south-western part of a steep-to, rocky reef; there is a depth of $3\frac{3}{4}$ fathoms (6^m9) on the north-eastern end of this reef.

Cha-mu hsü (Sabo shō) is a group of two small islets, about 40 feet (12^m2) high, lying about 2 miles south-eastward of Li-cheng chiao.

Light.—A light is exhibited, at an elevation of 78 feet (23^m8), from a white octagonal brick tower, 39 feet (11^m9) in height, painted with black vertical stripes, on the north-western islet of Cha-mu hsü.

Islets and dangers eastward of the northern group.—Nei-ch'ien shih (Naikimuta rock), lying about $3\frac{3}{4}$ miles north-eastward of Li-cheng chiao, has a depth of $1\frac{1}{2}$ fathoms (2^m7) over it and is steep-to; a pinnacle rock, with a depth of 8 fathoms (15^m6) over it, lies close southward of Nei-ch'ien shih. Wai-ch'ien shih (Kentei gan) lies about three-quarters of a mile eastward of Nei-ch'ien shih and has a depth of 5 feet (1^m5) over it; there are always strong whirlpools near this rock. A 9-fathom (16^m5) rock lies about one mile southward of Wai-ch'ien shih, with isolated depths of 8 and 10 fathoms (14^m6 and 18^m3) between. Pei-ch'ien shih (Pakimuta rock), lying about $1\frac{1}{2}$ miles north-north-eastward of Nei-ch'ien shih, has a depth of 7 fathoms (12^m8) over it. A shoal, with a depth of 9 fathoms (16^m5) over it, lies about one mile east-south-eastward of Pei-ch'ien shih (*Lat.* $23^\circ 38' N.$, *Long.* $110^\circ 44' E.$).

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Ting-tiao hsü (Ragged islet), situated about $3\frac{1}{2}$ miles northward of Li-cheng chiao, and 2 miles east-north-eastward of Kuei-pi shan, (Keangli point), the north-eastern point of P'eng-hu tao, is 54 feet (16^m5) high ; a rocky ridge extends about half a mile north-westward from the islet. Ting-tiao chiao, a partly drying reef marked by breakers, lies about 7 cables north-eastward of Ting-tiao hsü. Chi-shan hsü (Teichō shō) lies about three-quarters of a mile north-westward of Ting-tiao hsü, and is a black, rocky islet, 67 feet (20^m4) high, divided into two parts. Chi-shan chiao, situated about one mile north-north-eastward of Chi-shan hsü, is a reef which dries ; when covered it is always marked by breakers.

Niao hsü (Chō sho), is situated about $2\frac{1}{2}$ miles north-north-westward of Chi-shan hsü, and about $2\frac{1}{2}$ miles eastward of Lai-tzu (Pehu point), on the eastern side of Pai-sha tao ; it is 85 feet (25^m9) high and slopes gradually down from its eastern side to a sandy beach at its western end, where there is a small village. Niao hsü (*Lat. 23° 40' N., Long. 119° 39' E.*), lies on an extensive area of shoal ground almost joined to the shore southward, but separated from the shore reef westward by a deep narrow channel. This area includes extensive drying reefs and many rocks above and below water, for details of which the chart should be consulted. Pai-sha hsü (Sable islet), 71 feet (21^m6) high, lies about one mile northward of Niao hsü. The eastern side of the area is generally steep-to, and a $1\frac{1}{2}$ -fathom (3^m2) patch, situated about $1\frac{1}{2}$ miles north-north-eastward of Pai-sha hsü, is the outermost danger on the north-eastern side. An isolated 10-fathom (18^m3) rock lies about $2\frac{1}{2}$ miles eastward of Pai-sha hsü.

I-tung shih (Itō shō), with a least depth of $3\frac{1}{2}$ -fathoms (5^m9) over it, lies about $2\frac{1}{2}$ miles north-north-eastward of Pai-sha hsü.

Tidal streams and currents.—In the vicinity of all the rocks and dangers eastward of the northern group of Pescadores islands, the tidal streams run northward while the tide is rising and southward while the tide is falling, turning near the times of high and low water, with a maximum rate of 2 knots. This rate is, however, increased by the north-going current through Pescadores channel (page 213) ; in a position $2\frac{1}{2}$ miles southward of Cha-mu hsü, the north-going stream may attain a rate of 5 knots, whilst the south-going stream may not exceed a rate of $1\frac{1}{2}$ knots. About 8 miles eastward of Niao hsü there is a constant north-going stream ; with the north-going tidal stream it attains a rate of 5 knots, whilst the south-going tidal stream reduces its rate to half a knot.

Yü-weng tao.—**Dangers.**—**Anchorage.**—Yü-weng tao (Gyoō tō) is an island lying westward of P'eng-hu tao. Tung-pi t'ou (Shō tō), its south-eastern point, is a steep cliff 150 feet (45^m7) high and forms the western entrance point to P'eng-hu chiang. The southern coast of the island, between Tung-pi t'ou and Chih-tzū wei (Kitsushi bi), situated about $2\frac{1}{2}$ miles westward, forms two sandy bays, the eastern being named Hsiao-chih (Shōchi) wan. These two bays afford safe anchorage with north-easterly winds. Chih-tzū wei is a headland 179 feet (54^m6) high.

A pinnacle rock, swept to a depth of 20 feet (6^m1), lies about half a mile southward of Chih-tzū wei (*Lat. 23° 34' N., Long. 119° 28' E.*) ; there are always strong whirlpools near this rock, so that the southern side of this headland should be given a berth of one mile.

Charts 2409, 1760, 1963, 2661b, 1262, 1263.

Chart 1961.

Pi t'ou (Run tō) is a prominent headland, 81 feet (24^m7) high, situated about 2½ miles north-eastward of Chih-tzū wei. Pi-t'ou chiao, a drying reef, lies about half a mile westward of Pi t'ou, and about one mile further westward is Pi-t'ou chou (Bitō shū), a bank, with a least depth of 5½ fathoms (10^m1) over it. 5

Hsiao-men hsü (Shōmon sho) is an islet lying close off the northern extremity of Yü-weng tao; its southern side is a sandy beach and its northern side is a steep cliff. There is a sharp peak, 93 feet (28^m3) high, showing a strata of limestone, on the western extremity of the islet, which is thus readily identified from a distance. A reef extends about 6 cables northward from this extremity, and on its northern end is Pei-tuan-fang (Hakutambō), a rock with a depth of 6 feet (1^m8) over it. 10

Niu-kung (Gyukō) wan, situated between Hsiao-men hsü and Niu chiao (Gyu kaku), the western point of Pai-sha tao, lying about 1½ miles east-north-eastward, affords sheltered anchorage to vessels with local knowledge during the south-west monsoon, although the tidal streams may attain a rate of 5 knots. 15

Mao-shu shih (Nyauchutaa), lying about 1½ miles northward of the western point of Hsiao-men hsü, has a least depth of 1½ fathoms (2^m7) over it and is steep-to on its western side; there is a safe channel, with depths of over 10 fathoms (18^m3), between this shoal and Pei-tuan-fang. K'ung-k'o hsü (Kantasu), a rock 10 feet (3^m0) high, lies about 2½ miles northward of the western point of Hsiao-men hsü. 20

The eastern side of Yü-weng tao is described with P'eng-hu chiang; see below. 25

Light.—A light is exhibited, at an elevation of 199 feet (60^m7), from a white circular iron tower, 36 feet (11^m0) in height, situated on Chih-tzū wei.

Cable.—A submarine cable from the mainland of China is landed on the western side of Yü-weng tao, about one mile northward of Pi t'ou. See page 37. 30

P'eng-hu chiang.—**Islands and dangers.**—**Beacons.**—**Anchorage.**—P'eng-hu chiang (Hōko kō), situated between the eastern coast of Yü-weng tao and the western coasts of P'eng-hu tao and Pai-sha tao, affords safe anchorage in the north-east monsoon, whilst Ma-kung chiang (Bakō kō), an inner harbour in the south-eastern part, affords safe anchorage under all conditions of weather. 35

A reef extends about one mile from the eastern side of the southern entrance, and the outer end, which dries 8 feet (2^m4), is named Fouwen (Fuon); Chi-lung hsü (Keiro tō), an island, 91 feet (27^m7) high, with a rounded top, lies on the middle part of this reef. Ssu-chiao hsü (Shikaku tō), situated nearly one mile north-north-eastward of Chi-lung hsü (*Lat.* 23° 32' N., *Long.* 119° 32' E.) and a quarter of a mile offshore, is a flat islet, 55 feet (16^m8) high; a steep-to reef extends about 2 cables from its western side. 40

There is a least depth of 5 fathoms (9^m1) in the middle of the southern entrance to P'eng-hu chiang, which has been examined by sweeping. Hai-kan yen (Black rock), which dries 10 feet (3^m0) and is marked by a beacon, lies about 1½ miles northward of Ssu-chiao hsü. It is safer to pass westward of this rock, as the 3-fathom line extends from P'eng-hu tao to within about half a mile on its eastern side; vessels proceeding eastward of the rock should pass it at a distance of about 2 cables. 50

Chart 1961.

A drying reef, marked by a beacon, lies about three-quarters of a mile north-westward of the north-western extremity of P'eng-hu tao ; a $1\frac{1}{4}$ -fathom (2^m7) patch lies close northward of this drying reef.
 5 Ta-tsang hsü (Daiso tō), 61 feet (18^m6) high, lies about midway between the north-western extremity of P'eng-hu tao and the western extremity of Pai-sha tao, and is connected to the southern end of Pai-sha tao, eastward of it, by a drying reef. Southward of Ta-tsang hsü, there is a bay largely filled with drying reefs, in which Ta-yang
 10 hsü (Tampi islet), 25 feet (7^m6) high, and Hsiao hsü (Little islet), 12 feet (3^m7) high, are situated. Northward of Ta-tsang hsü lies Ta-tsang (Daiso) wan, a shallow bay lined with extensive drying reefs.

Northward of Tung-pi t'ou the eastern coast of Yü-weng tao, which
 15 forms the western side of P'eng-hu chiang, is indented by several small bays. About midway along this coast a reef extends about 3 cables. Chu-sung (Chiuka) wan, the bay northward of this reef, affords anchorage, in a depth of about $4\frac{1}{2}$ fathoms (8^m2), with Hai-kan yen bearing 165° , and the summit of Ta-tsang hsü, bearing 081° ;
 20 owing to shoal water extending from the northern shore of the bay, vessels should not anchor northward of this position. Drying reefs extend about 4 cables off the northern entrance point to Chu-sung wan. A breakwater, about 500 feet (152^m4) in length, was under construction on the northern side of this bay in 1935.

25 The northern entrance to P'eng-hu chiang lies between Heng-chiao-ma (Gyo kaku), the north-eastern point of Yü-weng tao, and the coast of Pai-sha tao, north-eastward, but it is encumbered with reefs and is too narrow and intricate to be used. A shoal, with a depth of 6 feet (1^m8) over it, lies about $1\frac{1}{4}$ miles southward of Heng-chiao-ma,
 30 and there are extensive shoal areas northward of this position. A black beacon surmounted by a cylinder, stands 7 cables north-north-eastward of Heng-chiao-ma.

Light.—A light is exhibited, at an elevation of 51 feet (15^m5), from a red circular concrete structure, 42 feet (12^m8) in height, on
 35 Fou-wen. This light was reported to be extinguished, in 1945.

Cables.—A number of submarine cables are laid across P'eng-hu chiang, just inside the southern entrance. See page 37.

Ma-kung chiang.—**Island and dangers.**—**Depths.**—**Beacon.**—Ma-kung chiang (Bakō kō) is entered from the south-eastern side of
 40 P'eng-hu chiang.

The entrance is nearly three-quarters of a mile wide between Feng-keui-wei chiao, situated close eastward of Ssu-chiao hsü (*Lat.* $23^\circ 33'$ N., *Long.* $119^\circ 32'$ E.), and Chin-keui t'ou, north-eastward. Sha-mao shan, a hill 143 feet (43^m6) high, situated on the southern shore about
 45 2 miles south-eastward of Feng-keui-wei chiao, is the highest land in this vicinity and is very prominent. There are general depths of from $5\frac{1}{4}$ to 8 fathoms (10^m5 to 14^m6) in the harbour, so that it can be used by vessels of deep draught. A shoal of $3\frac{1}{2}$ fathoms (5^m9) lies in the middle of the harbour north-north-eastward of Ko-lung t'ou,
 50 a point near Sha-mao shan. Foul ground extends to within one cable of this shoal from the southern shore. Westward of this shoal, the harbour has a minimum width of half a mile between the 6-fathom (11^m0) lines, but eastward of it, the space is much restricted by extensive drying reefs.

Charts 2409, 1760, 1968, 2661b, 1262, 1263.

Chart 1961.

Immediately within the entrance, on the north-eastern side of the harbour, is a bay named Nei Chiang which is largely filled by drying reefs. The town of Ma-kung (Makyujo), fronted by a sea wall and quay, is situated on the northern shore of this bay, and on the southern side of its entrance is Tse-tien tao (*Lat. 23° 33' N., Long. 119° 34' E.*), which is connected to the mainland eastward by a causeway, and where a Naval dockyard is situated. A cupola, a water tower, and a large concrete chimney, all situated close north-eastward of Ma-kung, are prominent; also two chimneys on Tse-tien tao. There is a beacon close off the north-western corner of Tse-tien tao. There is a pier on the northern shore about half a mile eastward of Tse-tien tao. There is a dry dock in the dockyard; *see* Appendix I, page 706.

Buoyage.—A red buoy is moored close northward of Feng-kuei-wei chiao, and two similar buoys mark the edge of the shore bank between Feng-kuei-wei chiao and Ko-lung t'ou. A red and black buoy marks the 3½-fathom (5^m9) shoal in the middle of the harbour.

Cables.—A submarine cable crosses the entrance to Nei Chiang, and two others cross the harbour above Ko-lung t'ou. *See* page 37.

Signal station.—Storm signals.—The signal station for Ma-kung Chiang is situated at Tung-pi t'ou (page 220).

Weather signals are displayed at Ma-kung Chiang.

Directions.—A vessel bound for Ma-kung Chiang from southward or westward should pass about one mile southward of Chih-tzu wei (*Lat. 23° 34' N., Long. 119° 28' E.*), and then steer for Ma-kung bearing about 072°; Ma-kung can be easily identified by its castle wall. Ssu-chiao hsü and Feng-kuei-wei chiao can be rounded at a distance of a quarter of a mile. When approaching from this direction care must be taken to avoid the spit extending about 1½ miles north-westward from Yuan-ting wan; the east-going tidal stream in this vicinity may attain a rate of 4 knots.

A vessel bound for Ma-kung Chiang from eastward can round Li-cheng chiao at a safe distance, and then pass between Hu-ching hsü and the south-western end of P'eng-hu tao.

Islands and dangers northward of Pai-sha tao.—For nearly 8½ miles northward of Pai-sha tao there are numerous coral reefs and shoals, rendering this part of Pescadores islands extremely dangerous. *See* views on chart 1961.

Ku-p'o hsü (Koba shō) lies nearly 2½ miles northward of the western end of Pai-sha tao, and when seen from a distance of about 5 miles westward it appears as a row of four small islets. The island consists of two hillocks connected by a narrow ridge; the northern hillock has a rugged summit, 54 feet (16^m5) high, with a stone monument on it 15 feet (4^m6) in height. A reef extends about 3 cables from the western side of Ku-p'o hsü and nearly 4 cables north-westward of the north-western point of the island is a rock which dries 6 feet (1^m8). A rock, which dries 12 feet (3^m7), lies close off the south-western point of the island. T'ieh-chen hsü, a flat blackish rocky islet, 41 feet (12^m5) high, lies nearly half a mile eastward of the southern point of Ku-p'o hsü, and about 3 cables northward of this islet are three small rocks, about 3 feet (0^m9) high, shaped like human heads and known as San-chiang-chun.

The space between Ku-p'o hsü and Pai-sha tao is mostly filled by foul ground, through which there are two narrow channels. About

Charts 2409, 1760, 1968, 2661b, 1262, 1263.

Chart 1961.

midway between Ku-p'o hsü and the western end of Pai-sha tao are two small islets surrounded by a reef. The western islet, is 26 feet (7^m9) high; the eastern islet, is 41 feet (12^m5) high, and its south-
 5 western side, being of white sand, is visible from a considerable distance.

Chi-pei tao (Kitsubai sho), the largest of the islands northward of Pai-sha tao, lies with its southern point about 2½ miles east-north-eastward of Ku-p'o hsü. Its coasts consist mainly of sand,
 10 and there is an isolated hillock, 57 feet (17^m4) high, on its western extremity; the eastern end of the island is about the same height. There is a village, with a population of about 1,400, on the southern side of the island. Foul ground extends about 1½ miles southward from Chi-pei tao (*Lat. 23° 45' N., Long. 119° 36' E.*), and in its centre
 15 lies an islet, 24 feet (7^m3) high. There is a narrow passage, with a least depth of 3½ fathoms (5^m9) in the fairway, between this foul ground and the shore reef extending from Pai-sha tao, on the edge of which is an islet 31 feet (9^m4) high.

A drying reef extends about 2 miles northward from Chi-pei tao,
 20 and at its northern extremity lies Mu-tou hsü (Kita jima), a flat islet 51 feet (15^m5) high. Kuo hsü, a rocky islet 26 feet (7^m9) high, with a fisherman's hut on it, lies nearly one mile southward of Mu-tou hsü. Foul ground extends up to about 1½ miles off the western side of the drying reef, and near its outer edge are situated Ch'ai-ting
 25 chiao (Saidan shō), a rock 5 feet (1^m8) high, and Tao-yeh chiao, which dries 3 feet (0^m9).

A pinnacle rock, with a depth of 1½ fathoms (2^m7) over it, lies nearly 1½ miles north-eastward of the northern point of Chi-pei tao, and within a distance of one mile north-westward of this rock are
 30 several rocks, with a least depth of 4½ fathoms (8^m7) over them.

The reef extending from the northern side of Chi-pei tao continues for fully 1½ miles northward of Mu-tou hsü (*Lat. 23° 47' N., Long. 119° 36' E.*) and this part is sometimes known as North rocks; it has three rocky patches on it. Kuan-ti-yeh chiao (Togyo shō), the
 35 southernmost patch, dries 6 feet (1^m9); Erh-yao shih (Nyoyo shō), the middle patch, is awash; Ta-yao chiao (Taigyo shō), the northernmost patch, dries about 7 feet (2^m1), and is steep-to on its northern side.

Weng-kung shih (Okō shō), situated about 3½ miles westward of Mu-tou hsü, is partly awash and is marked by breakers; another
 40 reef, with a least depth of 2½ fathoms (4^m6) over it, lies about half a mile westward of Weng-kung shih, and there are several other shoals, with depths of less than 5-fathoms (9^m1) over them, in the vicinity. These reefs, sometimes known as North-west Outlier, and North rocks, are very dangerous.

45 **Light.**—A light is exhibited, at an elevation of 164 feet (50^m0), from a circular iron tower, 134 feet (40^m8) in height, painted black and white in horizontal bands, on Mu-tou hsü; near the lighthouse is a small house surrounded by a wall.

It has been reported that the visibility of this light is considerably
 50 reduced during strong northerly winds, which are laden with dust, or by spray from the sea covering the lantern.

Chart 1760.

Off-lying banks.—Saracen bank, and other banks northward of Pescadores islands are described on page 226.

Charts 2409, 1968, 2661b, 1262, 1263.

Charts 3231, 3658.

WESTERN SIDE OF FORMOSA.—Wai-sheng chiao to Pai-sha chia.—General remarks.—From Wai-sheng chiao (page 211), the coast of Formosa trends north-north-eastward for about 95 miles to Pai-sha chia (Pakusa point). This stretch of coast is low for about 30 miles from Wai-sheng chiao, but there are hills on or near the coast further northward to within about 10 miles of Pai-sha chia. 5

Chart 3231.

Coast.—Anchorages.—Storm signals.—The coast between Wai-sheng chiao (*Lat. 23° 42' N., Long. 120° 10' E.*) and Ta-an Chiang (Taian kō), situated about 46 miles north-north-eastward, is low, with sand dunes and small hillocks, so that there are a few noticeable landmarks; near Tai-hsi (page 211) there are no hills within 20 miles of the coast, but proceeding northward they gradually approach it to within 3 or 4 miles. The central mountain range of Formosa, with peaks over 10,000 feet (3,048^m0) high, can only be seen in the fore- 15 noons during fine weather. The whole of this coast is fringed by drying mud and sand flats, which extend as much as 3 miles in places, and they should be approached with the utmost caution, particularly as the tidal streams are strong. 20

Hsin-hu-wei ch'i flows into the sea about 6 miles north-north-eastward of Wai-sheng chiao, and Hsi-lo ch'i (Seira kei) about 3 miles further north-north-eastward. The channel across the flats leading to the entrance of Hsi-lo ch'i is so exposed that even junks do not anchor here. Bamboo platforms, which are fairly good marks, 25 have been erected here and there along the coast between Tai-hsi and the mouth of Hsi-lo ch'i.

Fang-yüan po-ti (Shazan hakuchi) is the roadstead fronting Fang-yüan (Shazan), a small town situated on the coast about 5 miles north-north-eastward of the mouth of Hsi-lo ch'i; a channel across the mud flat, with the opening south-westward, leads to the town. Depths of less than 3 fathoms (5^m5) extend nearly 3 miles westward of Fang-yüan. Nan chou (Minamino shu), 5 feet (1^m5) high, and Pei 30 chou (Kitano shu), 3 feet (0^m9) high, lie near the outer edge of the drying sandbanks near Fang-yüan.

Cho-shui ch'i (Dakusui kei), the longest river in Formosa, flows into the sea through a delta with its centre about 8 miles north-north-eastward of Fang-yüan; it is impossible for small boats to pass over the flats off its mouth even at high water.

Lu-chiang (Rokukō) is situated close north-eastward of the delta of Cho-shui ch'i, and had a population of 39,823 in 1935; trade is carried on by junks with ports of China. Local storm signals are displayed from a mast at the north-western end of the town. Pa-kua 40 shan (Hakkei san), a hill 755 feet (230^m1) high, is situated about 8 miles eastward of the town. Banks of mud and sand, which dry, 45 extend about 3 miles offshore, and outside these is the roadstead of Lu-chiang po-ti (Rokukō hakuchi).

T'u-ko-k'u (Tokatsukutsu) is a village situated about 9 miles north-north-eastward of Lu-chiang and on the northern side of the entrance to Ta-tu ch'i (Taito kei); the entrance to the river is blocked 50 by silt, and although it is half a mile broad in places, it is only navigable by small boats up to a distance of about 10 miles from the mouth. Vessels lying at anchor off the coastal bank communicate with the shore by means of bamboo rafts. Local storm signals are

Charts 1760, 1968, 2661b, 1262, 1263.

Chart 3231.

displayed at T'u-ko-k'u. A black chimney situated about 6 miles south-south-eastward of T'u-ko-k'u, and a black chimney, with a white house close to it, situated about 4 miles north-eastward of this village, are conspicuous.

Tai-chung chiang (Niitaka kō), described below, is an artificial harbour opposite the village of Wu-hsi (Gosei), which lies at the mouth of a stream situated about 4 miles north-north-eastward of T'u-ko-k'u (*Lat.* 24° 12' N., *Long.* 120° 29' E.). There is anchorage outside the harbour, in from 7 to 10 fathoms (12^m8 to 18^m3), mud and sand, about 2 miles offshore, but it is exposed to all except offshore winds.

Ta-chia ch'i (Taikō kei) discharges through a delta extending from 3 to 5 miles northward of Wu-hsi.

15 Ta-an ch'i (Taian kei) flows into the sea about 10 miles north-north-eastward of Wu-hsi, through a broad shallow estuary which penetrates the coast for a distance of about 3½ miles, and is crossed by a railway bridge about 2 miles inland. The village of Ta-an (Taian) lies about 1½ miles southward of the river entrance, and Ta-an chiang (Taian kō) is a junk anchorage opposite it. The coastal bank dries out to about half a mile here, and there is a channel across it indicated by stakes; about one mile offshore the depths increase rapidly to between 5 and 8 fathoms (9^m1 to 14^m6). Ta-chia (Taikō) is a large town lying about 3 miles south-eastward of Ta-an. It is situated between 25 two prominent hills; the southern, named Peng shan (Hō san), is 580 feet (176^m8) high, and its southern face is reddish in colour; the northern, named T'ieh-chen shan (Tetsuchin san), is a thickly wooded, square hill, 767 feet (233^m8) high.

30 **Tai-chung chiang.—Lights.**—Tai-chung chiang (Niitaka kō) consists of an inner and an outer harbour enclosed by breakwaters and is approached through a dredged channel. Silting is heavy and constant dredging is necessary. The harbour was officially opened in 1948, but works were still in progress at that time.

This harbour is designed as a major commercial port, and plans to 35 accommodate 21 vessels of 10,000 tons, with berthage for 6 alongside, as well as upwards of 100 fishing vessels. At the time of opening, it was estimated that vessels of 300 tons could be accommodated, and that vessels of 5,000 tons could be accommodated in 2 years time.

Leading lights are situated at Tai-chung chiang. The front light 40 is exhibited, at an elevation of 21 feet (6^m4), from a green framework tower; the rear light, at an elevation of 46 feet (14^m0), from a red framework tower. Both structures carry black triangular daymarks.

Off-lying shoals.—Outlying banks.—The depths outside the drying coastal bank between Fang-yüan and Ta-an are very irregular, 45 and numerous shoals lie within a distance of 2 miles outside the edge of this bank; passing vessels should keep in depths of not less than 10 fathoms (18^m3).

Chart 1760.

A sounding of 10 fathoms (18^m3), sand and mud, has been obtained 50 about 38 miles westward of Lu-chiang, and the same depth was obtained about 3½ miles north-north-westward of this position by the Japanese warship *Manchu* in 1917; a similar depth, known as Saracen bank, was obtained about 9 miles further north-north-westward by H.M.S. *Saracen* in 1854. Other soundings of from 9 to

Charts 1760, 1968, 2661b, 1262, 1263.

Chart 1760.

10 fathoms (16^m5 to 18^m3) are charted in the same general vicinity.

Chart 3231.

Tidal streams and currents.—Near Ta-an Chiang the tidal streams set northward with the rising tide, and southward with the falling tide; in summer, however, owing to the current, there is a constant north-going stream, with a maximum rate of about 2 knots with the rising tide, and one knot with the falling tide.

Off T'u-ko-k'u (*Lat. 24° 12' N., Long. 120° 29' E.*) there is a north-going stream, but no south-going stream is apparent. Off Lu-chiang the south-going stream is noticeable, but its rate is less than half that of the north-going stream; proceeding southward the rate of the south-going stream increases, attaining the same rate as the north-going stream, though neither has been observed to exceed 4 knots.

Coast.—Between Ta-an and the mouth of T'ung-hsiao ch'i (Tsūshō kei), situated about 8 miles north-eastward, is a level plain through which several small rivers flow. Huo-yen shan (Kaen san), a peak 1,965 feet (598^m9) high, rises at the back of this plain and about 7 miles eastward of Ta-an, and from this peak a range of mountains and hills extends northward to the sea; Tz'u-kaō shan (Mount Sylvia), situated nearly 30 miles eastward of Huo-yen shan, is 11,719 feet (3,572^m0) high and has a pointed summit and is very prominent (chart 1968). Hu-t'ou shan (Kotō san), a hill 305 feet (92^m9) high, resembling the head of a tiger, is situated nearly one mile north-eastward of the mouth of T'ung-hsiao ch'i; T'ung-hsiao (Tsūshō), a village with a population of about 1,000 in 1931, is situated on the southern slope of Hu-t'ou shan and about half a mile north-eastward of the mouth of the river. T'ung-hsiao ch'i can be entered by junks at high water.

From Hu-t'ou shan a range of hills runs along the coast to the southern entrance point of Hou-lung ch'i, situated about 7 miles northward.

Charts 3231, 3658.

Hou-lung po-ti.—**Anchorage.**—**Storm signals.**—Hou-lung po-ti (Kōryū hakuchi or Kōryū road), situated off the mouth of Hou-lung ch'i, affords open anchorage in depths of from 4 to 8 fathoms (7^m3 to 14^m6). Pei-tzu-tao shan (Piatau san), an isolated hill 305 feet (89^m0) high, situated on the southern side of the mouth of the river, is fairly prominent.

The entire mouth of Hou-lung ch'i is occupied by a sandbank, which dries about 9 feet (2^m7), but junks can easily enter at high water; posts are erected on both sides of the entrance. There is considerable trade by junks with ports on the eastern coast of China.

The town of Hou-lung (Kōryū) is situated on the northern bank and about 2 miles up the river. The village of Kung-szu-liao (Kōshiryō) is situated at the foot of Pei-tzu-tao shan; three white oil tanks on the western side of this village, and the iron bridge over the river, are prominent. Local storm signals are displayed at Kung-ssu-liao (*Lat. 24° 37' N., Long. 120° 45' E.*).

Coast.—**Dangers.**—**Anchorage.**—The coast between Hou-lung and Chiu-chiang (Kyūkō or Kukan), situated about 16 miles north-north-eastward, is a sandy beach with occasional rocky parts, and within are alternating flat plains and hills; the coastal bank dries out

Charts 1760, 1968, 3236, 2412, 1262, 1263.

Charts 3231, 3658.

fully one mile in places. From Chiu-chiang to Pai-sha chia (Pakusa point), situated about 14 miles north-eastward, there is a sandy beach covered with scrub and grass, with a broad, cultivated plain within.

- 5 A reef, with a depth of 16 feet (4^m9) over it, lies about 1½ miles northward of the northern entrance point to Hou-lung ch'i, and about 7 cables offshore

Chung-chiang ch'i (Chūkō kei) flows into the sea about 4 miles north-eastward of Hou-lung. There is a bar, which dries, across the
10 mouth of the river, but a narrow passage, which changes from time to time, permits small craft to enter at half tide. Chung-chiang po-ti (Chūkō hakuchi or Chunkan road), situated off the mouth of the river, affords temporary anchorage in a depth of about 5 fathoms (9^m1), about half a mile outside the bar; this anchorage is sheltered from
15 southerly winds, but the holding ground is bad. I-pao shan (Ipo san), 206 feet (62^m8) high, is situated on the southern side of the mouth of Chung-chiang ch'i, and about 1½ miles westward of I-pao shan is a hill with red cliffs and a sharp summit, 173 feet (52^m7) high; these two hills are prominent landmarks for identifying the river
20 entrance.

The town of Chung-chiang (Chūkō or Chunkan) lies about one mile inland on the northern side of the entrance to Chung-chiang ch'i.

- A sandy shoal, with a depth of 1½ fathoms (2^m7) over it, lies nearly 3 miles northward of I-pao shan (*Lat.* 24° 40' N., *Long.* 120° 49'
25 E.) and 1½ miles offshore.

- Yen-shui chiang (Ensui kō or Yamutsuikan) is a small harbour formed by the entrance to a small river situated about 5 miles north-eastward of the mouth of Chung-chiang ch'i. A sand cay 4 feet (1^m2) high, lies on the coastal bank which dries out to fully one mile
30 offshore here; on the southern side of this sand cay there is a channel over the coastal bank which can be used by small craft at half tide.

- The village of Hsiang-shan (Kōzan) is situated about one mile northward of Yen-shui chiang. A reef, with a depth of 2 fathoms (3^m7) over it, lies about 2 miles north-north-westward of Yen-shui
35 chiang and 1½ miles offshore.

- About 6½ miles northward of Yen-shui chiang, Chiu-chiang ch'i (Kyūkō kei) and Feng-shan ch'i (Hōzan kei) flow into the sea through a single channel across the coastal bank, which, is however, only available for small craft at half tide. Chiu-chiang po-ti (Kyūkō
40 hakuchi or Kukan road) is the roadstead opposite the above channel. Chiu-chiang ch'i, the southern of the two rivers, is a broad shallow estuary penetrating the coast for a distance of about 4 miles, with its entrance encumbered with islands, on one of which is situated the village of Chiu-chiang (Kyūkō or Kukan), with a population of 900
45 in 1931; the Custom office, a red brick building in it, is fairly prominent. Hsin-chu (Shinchiku or Shinteku), situated about 2½ miles south-eastward of Chiu-chiang, had a population of 47,534 in 1931.

- K'eng-tzu-k'ou shan (Kōshikō san or Table hill) is a grassy hill with
50 a flat summit situated about 2½ miles north-eastward of Chiu-chiang, and is prominent on the otherwise low coast.

Hung-mao chiang (Kōmō kō or Ammōkantsun), situated about 1½ miles north-north-eastward of K'eng-tzu-k'ou shan is a small harbour in the mouth of a river, but it is only available for junks.

Charts 1760, 1761, 1968, 3236, 2412, 1262, 1263.

Chart 3658.

K'an-t'ou-t'so chiang (Kantōtsukan), lying about 7 miles north-north-eastward of K'eng-tzu-k'ou shan, is similar to Hung-mao chiang.

Pai-sha chia (Pakusa point), the north-western point of Formosa, has a grassy sand hill 62 feet (18^m9) high on it, but the coast is almost straight and the point does not project. A sandbank dries out to fully half a mile offshore on the south-western side of the point.

Coral reefs were reported, in 1953, to exist about one mile offshore between K'an-t'ou-t'so chiang and Hsü-t'so chiang (Kōtsūkan), described below, which lies about 6 miles east-north-eastward of Pai-sha chia.

Light.—A light is exhibited, at an elevation of 120 feet (36^m6), from a white circular brick tower, 82 feet (25^m0) in height, situated on Pai-sha chia (*Lat. 25° 03' N., Long. 121° 04' E.*). 15

Chart 3231, 3658.

Current and tidal streams.—About 5 miles offshore in the vicinity of T'ung-hsiao, Hou-lung, and Chung-chiang the "Kata shio" (one-direction current) always sets northward with considerable strength, but is weakened during rising water and reinforced during falling water. Approaching nearer the coast the rate of this current is gradually reduced, and within a distance of 2 miles offshore it almost disappears with the south-going tidal stream. The rate of the current does not appear to exceed 2 knots northward of Pai-sha chia. 20

Chart 3658.

NORTHERN SIDE OF FORMOSA.—Pai-sha chia to Chi-lung chiang.—**General remarks.**—From Pai-sha chia the coast trends generally east-north-eastward for about 30 miles to Fu-kuei chiao (Puki kaku), the northern point of Formosa, and then turns to about east-south-eastward for about 15 miles to the entrance to Chi-lung chiang (Kiirun ko). The greater part of this coast is mountainous, and it contains the important harbour of Tan-shui chiang (Tansui kō). 25

Coast.—**Dangers**—The coast for about 12½ miles east-north-eastward of Pai-sha chia (*Lat. 25° 03' N., Long. 121° 04' E.*) consists mostly of low sand hills, fronted by shoal water for about half a mile, and thence to Tan-shui chiang, situated about 8 miles further east-north-eastward, is formed by a tableland from 486 to 710 feet (148^m1 to 216^m4) high. 30

Hsü-ts'o chiang (Kōtsūkan) and Nan-k'an chiang (Nankankan), situated about 6 miles and 10½ miles, respectively, east-north-eastward of Pai-sha chia, are small junk harbours at the mouths of rivers, but are only available at high water. Two pinnacle rocks, with depths of 1½ and 2½ fathoms (2^m7 and 5^m0) over them, lie about 7 cables and 1½ miles, respectively, north-eastward of Nan-k'an chiang. 40

Dumping ground—A dumping ground for ammunition, indicated by pecked lines on the chart, lies about 4½ miles offshore just eastward of Nan-k'an chiang. 45

Chart 2376, plan of Tan-shui chiang.

Tan-shui chiang.—**General remarks.**—**Harbour limits.**—**Aspect.**—Tan-shui chiang is the estuary of Tan-shui ho, which flows into the sea about 9 miles east-north-eastward of Nan-k'an chiang. It is the only river port in Formosa, and formerly had a considerable overseas shipping trade, but, with the development of Chi-lung 50

Charts 1760, 1761, 1968, 3236, 2412, 1262, 1263.

Chart 2376, plan of Tan-shui chiang.

chiang, the majority of its trade was diverted to the latter port, and the harbour has been allowed to silt up greatly in recent years. It was reported, in 1949, that the harbour was only available for small
 5 vessels; even these are obliged to wait for high water before crossing the bar off the entrance. The harbour limit is within the arc drawn with a radius of 2 miles from the lighthouse on the northern side of the harbour entrance (*see below*); the Outer harbour is the area westward of a line drawn from this lighthouse to the southern
 10 entrance point of the river, and the Inner harbour is the area eastward of this line.

Kuan-yin shan (Kannon san), a mountain 1,986 feet (605^m3) high, situated on the southern side of the entrance to Tan-shui chiang, is a good mark for making the harbour; from southward it shows
 15 two peaks, but from other directions it appears as one sharp peak and is very prominent. On the northern side of the estuary, and about one mile north-westward of the lighthouse at the entrance, is a disused lighthouse; a radio station, with four masts, situated south-eastward of the disused lighthouse, is also prominent.

20 Yu-ch'e-k'ou is situated on the northern side of the harbour close within the entrance. The town of Tan-shui, which had a population of 24,829 in 1935, lies on the northern shore about one mile inside the entrance; it is the seaport of Tai-pei (Taihoku), the capital of Formosa, which is situated about 9 miles up the river. In 1950 the
 25 population of Tai-pei was 450,800.

Depths.—The entrance to the harbour is fronted by a bar, called Shuan-chou, extending seaward for about 1½ miles from the lighthouse at the entrance. The fairway in the Outer harbour is about 2
 30 cables wide between drying banks, and had a least depth of 7 feet (2^m1), in 1950, in its centre. The Inner harbour is encumbered with drying mud flats, with parts above water, and shallow channels between. In 1951, the best channel in the outer part was on the northern side, and was marked by leading lights, described below. Above the town of Tan-shui (*Lat. 25° 10' N., Long. 121° 29' E.*),
 35 the navigable channel is on the western side of the river.

The depths in the entrance change every time the river is in flood; the bar is inclined to be shoaler in winter, the depths being from one to 3 feet (0^m3 to 0^m9) less than those in summer. Typhoons also appear to effect the depths on the bar considerably.

40 **Lights.**—A light is exhibited, at an elevation of 33 feet (10^m1), from a white square steel framework tower surmounted by a white spherical daymark, situated on the northern side of the entrance to Tan-shui chiang.

Leading lights are established in the town of Tan-shui. The front
 45 light is exhibited, at an elevation of 48 feet (14^m6), from a square steel framework tower, painted green, situated nearly one mile east-south-eastward of the light structure described above; the rear light, at an elevation of 74 feet (22^m6), from a similar structure, painted red, situated about half a mile further east-south-eastward. Each
 50 structure carries a white triangular daymark. The lights, in line bearing 110°, mark the best channel into the Inner harbour.

Anchorage.—**Pier.**—The best outer anchorage is about 1½ miles west-north-westward of the light at the entrance (*Lat. 25° 11' N., Long. 121° 28' E.*), in a depth of about 7 fathoms (12^m8), mud;

Charts 3658, 1761, 1968, 3236, 2412, 1262, 1263.

Chart 2376, plan of Tan-shui chiang.

this position is, however, entirely exposed, and vessels must be prepared to get under way immediately.

The anchorage space in the inner harbour is very restricted. Owing to the sandy bottom in the river, vessels are liable to drag their anchors; they should moor, with the anchors up and down stream. 5

With the river in flood the safest anchorage is off the northern bank between the Custom's flagstaff, situated about half a mile west-north-westward of the front leading light, and Garrison wharf, 10 about a quarter of a mile further westward; under any circumstances vessels should never anchor southward of the centre of the stream nor seaward of Garrison wharf.

A wooden pier belonging to an oil company is situated at Pi-tzu-t'ou, about half a mile above the front leading light. 15

Tidal streams.—During floods the rate of the stream in the river is considerably increased, and there is then a strong eddy along the northern bank between Pi-tzu-t'ou and a position one mile further up the river. With heavy squalls the stream is converted into whirlpools, and at the junction of this river with Chi-lung ho, about a 20 mile below Tai-pei, a powerful torrent is formed, which rushes towards the harbour mouth, churning up mud and sand from the bottom of the river, rendering the situation of vessels at anchor extremely dangerous.

Harbour facilities. — Supplies. — Communications. — There are 25 numerous quays for junks and lighters, and berthage space alongside for small shallow draught vessels. Vessels which cannot berth alongside discharge by junk or lighter.

Stocks of native coal are usually maintained. There are oil fuel tanks in the port, but it was reported, in 1949, that there were no 30 bunkering facilities.

Provisions of all kinds are obtainable; there are no regular water boats, but water can be taken in from junks or sampans.

The port is connected to the general telegraph system. There is a railway to Tai-pei. 35

Storm signals.—Signal station.—Local storm signals are displayed from the Government offices, situated about half a mile south-eastward of the Custom house.

Signals to vessels at the outer anchorage are made from a flagstaff at the light structure at the harbour entrance. 40

Climate and health conditions.—The climate of Tan-shui is hot in summer, but cool and damp in winter, the extremes ranging from 98° Fahr. in July to 41° in December.

Malaria is rife during the summer season, and beri-beri is also prevalent; the contagious diseases are typhoid and scarlet fever. 45 There are not many species of injurious insects, but in the neighbouring mountains there is an extremely poisonous small snake.

Consuls.—There is a British Consul at Tan-shui and a Vice-consul at Tai-pei.

Climatic table.—For climatic table at Tai-pei, see Chapter I, page 68. 50 *Chart 3658.*

Coast.—The coast between the northern entrance point to Tan-shui chiang and Fu-kuei chiao (*Lat. 25° 18' N., Long. 121° 32' E.*), situated about 10 miles north-eastward, is a beach of sand and pebbles,

Charts 1761, 1968, 3236, 2412, 1262, 1263.

Chart 3658.

fringed by a reef extending as much as half a mile in places. Within the beach are low hills, rising gradually inland to Ta-t'un shan, a range with peaks over 3,000 feet (914^m4) high, situated about 5 miles from the coast.

Fu-kuei chiao (Puki kaku), the northern point of Formosa, is low and a rocky shoal extends about a quarter of a mile from it; there is usually a strong tide race in this vicinity, and the point should be given a wide berth. There is a small beach between the rocks on the western side of the point, where landing can be effected in calm weather.

Lin-shan pi (Minsoa point) lies about 1½ miles westward of Fu-kuei chiao. (Lat. 25° 18' N., Long. 121° 32' E.).

Light.—A light is exhibited, at an elevation of 161 feet (49^m1), from an octagonal iron tower, 117 feet (35^m7) in height, painted black and white in horizontal bands, situated on Fu-kuei chiao.

Cables.—Four submarine cables, indicated on the chart, are landed on the northern side of the northern entrance point to Tan-shui Chiang. See page 37.

Off-lying shoal.—A rocky shoal, with a depth of 11 fathoms (20^m1) over it, surrounded by depths of about 50 fathoms (91^m4), lies about 10 miles west-north-westward of Fu-kuei chiao; its position is doubtful.

Tidal streams.—Between Tan-shui Chiang and Fu-kuei chiao the tidal streams run north-eastward for 7 hours on the falling tide, and south-westward for 5 hours on the rising tide; the south-west-going stream has a maximum rate of about 2 knots; the north-east-going stream attains a rate of 3½ knots opposite the harbour entrance, increasing to 5 knots off Fu-kuei chiao. The north-east going stream may attain even greater rates during the south-west monsoon. Northerly or north-easterly winds cause strong tide races and heavy seas off this point, and the navigation of small vessels in this vicinity is then extremely hazardous.

Coast.—Dangers.—Anchorage.—The coast between Fu-kuei chiao and Shih-tzu-t'ou pi, a cliffy point situated about 7½ miles south-eastward, is rocky; about 4 cables southward of Shih-tzu-t'ou pi is a round-topped hill 247 feet (75^m3) high. A curiously shaped rock, named Chu-tai (Double rock) 77 feet (23^m5) high, lies about 2 cables eastward of this point, and reefs extend about 6 cables eastward from the rock; the outer reef is awash. On the southern side of Shih-tzu-t'ou pi is a small harbour suitable as a refuge for small vessels with local knowledge. Chin-pao-li (Kimpori), situated about three-quarters of a mile south-westward of Shih-tzu-t'ou pi is a prosperous place, and small quantities of provisions can be obtained there.

Yeh-liu pan-tao (Yali peninsula) extends from the coast in a north-easterly direction; Kuei-t'ou pi, its outer extremity, lies about 3 miles east-south-eastward of Shih-tzu-t'ou pi and is a steep sandstone point with rocks extending 2 cables from it, the outermost being 21 feet (6^m4) high. Yeh-liu wan (Masu bay), situated between Shih-tzu-t'ou pi and Yeh-liu pan-tao, has a long sandy beach and affords anchorage for small vessels.

Charts 2618, 3658.

The greater part of the coast between Yeh-liu pan-tao and Wan-jen-tui pi (Banjintai bi), situated about 4 miles south-eastward, is

Charts 1761, 1968, 3236, 2412, 1262, 1263.

Charts 3658, 2618.

fringed by reefs and rocks, which extend as much as 2 cables offshore in places.

Chart 2618.

Ta-shan pi (Daisan bi) is a point situated about 6 cables west-north-westward of Wan-jen-tui pi. Wan-jen-tui pi is remarkable owing to the peculiar shape of some sandstone rocks lying close off it; on the seaward side of the point are several patches of perpendicular stratified cliffs.

Chi-lung chiang, to which Wan-jen-tui pi is the western entrance point is described below.

Light.—A light is exhibited, at an elevation of 132 feet (40^m2) from a white circular tower, 36 feet (11^m0) in height, on Wan-jen-tui pi.

Islands and dangers in the approach to Chi-lung chiang.—Hsin lai (Shinrai), situated about 2½ miles northward of Wan-jen-tui pi, consists of three isolated rocky heads; the western has a least depth of 3 fathoms (5^m5) over it; the south-eastern 3½ fathoms (6^m4); and the north-eastern 8 fathoms (14^m6). The 394-foot (120^m1) high hill on Pi-t'ou chiao (Peitau kaku), described on page 238, in line with the south-western point of Ch'i-lung tao (*see* below), bearing 117°, leads about one cable north-eastward of the north-eastern head of Hsin lai; these rocks are covered by the *red* sector of Wan-jen-tui-pi light (*Lat.* 25° 09' N., *Long.* 121° 44' E.) between the bearings of 179° and 187°.

Chi-lung tao (Keelung island), situated about 2½ miles north-eastward of Wan-jen-tui pi, is a precipitous, black, rocky island with a flat summit 602 feet (183^m5) high, and is an excellent mark for making Chi-lung chiang. Hsiao-ch'i (Shōkitsu), situated about one cable off the north-western side of the island is a rocky islet 92 feet (28^m0) high. Ch'i-an shih-t'ai (Kitsugan sekitai), a spit of gravel and rock, extends about 1½ miles south-westward from Chi-lung tao; up to a distance of 6 cables from the island there are depths of less than 3 fathoms (5^m5) over this spit, and beyond this the depths increase gradually to 14 fathoms (25^m6) at its outer end. There are strong tide races over the entire spit, and it should never be crossed. Wan-jen-tui-pi lighthouse bearing 238°, and open north-westward of Chung shan (Chuzan), an island situated on the eastern side of the entrance to Chi-lung chiang, leads south-eastward of Ch'i-an shih t'ai. There is a clear channel between this spit and Chung shan.

CHI-LUNG CHIANG.—**General remarks.**—**Harbour limits.**—Chi-lung chiang (Keelung harbour), one of the two most important ports in Formosa, is entered between Wan-jen-tui pi and T'ung-p'an hsü (Tōban sho), lying about half a mile north-eastward. The harbour is sheltered by hills on the eastern, western, and southern sides, and from north-eastward by the islands Chung shan and She-liao tao (Sharyō tō); the latter is separated from the main coast southward by the narrow channel Pa-ch'ih men (Hasshakumon), which is crossed by a white stone bridge.

The limits of the harbour are a line drawn from Wan-jen-tui pi (*Lat.* 25° 09' N., *Long.* 121° 44' E.) to the north-western point of Chung shan, and a line across the eastern entrance to Pa-ch'ih men.

Charts 1761, 1968, 3236, 2412, 1262, 1263.

Chart 2618.

From the entrance the harbour runs for nearly a mile southward as far as Hsien-tung-pi (Sendō bi) breakwater, which is situated on the western side; this part is known as the Outer harbour. The Inner harbour runs south-westward for nearly $1\frac{1}{4}$ miles, and has a width of about 2 cables. Northerly winds cause a heavy sea in the Outer harbour, but it affords safe anchorage with winds from any other direction. The Inner harbour affords safe anchorage at all times. The southern and eastern parts of the Outer harbour and the whole of the Inner harbour have been dredged. There is very little silting. Vessels of up to 30,000 tons can enter the harbour, but the Inner harbour is not normally used by vessels of more than 10,000 tons. The land in the vicinity of the harbour is thickly wooded and rises in undulating hills backed by high mountains.

The town of Chi-lung (Keelung) is situated at the head of the Inner harbour. In 1950 the population was 145,200.

Tidal streams in the approach.—The tidal streams near the northern coast of She-liao tao run westward from one to 7 hours after low water, and eastward from 7 hours after low water to one hour after the next low water; the maximum rate is from 2 to 3 knots. In winter the east-going stream is stronger than the west-going stream, and in summer the reverse is the case.

The tidal streams of the north-western side of She-liao tao, just outside the harbour entrance, turn to north-west and south-east, respectively, one to 2 hours before high and low water at Chi-lung; their maximum rate is about $1\frac{1}{4}$ knots.

Outer harbour.—Breakwaters.—Dangers.—The entrance to the Outer harbour is about $1\frac{1}{2}$ cables wide between the ends of two breakwaters extending from Wan-jen-tui pi and T'ung-p'an hsiü, respectively. A second breakwater is under construction on the eastern side of the harbour, about 2 cables inside the entrance.

The greater part of the western side of the Outer harbour has been reclaimed. Hu-hao ao (Kagō ō) is a small bay entered about 2 cables southward of Wan-jen-tui pi (*Lat. 25° 09' N., Long. 121° 44' E.*). There is a pier on the southern side of this bay and at the head of the bay is Hsien-tung Quarantine station. Foul ground extends about three-quarters of a cable eastward from the southern entrance point of Hu-hao ao.

Hsien-tung pi, situated about 6 cables southward of Wan-jen-tui pi, is the extremity of a small promontory, on which is Hsien-tung shan (Sendō san), a prominent conical hill 188 feet (57^m3) high. A breakwater extends about 2 cables eastward from Hsien-tung pi, across a shallow coral reef.

T'ung-p'an hsiü, situated on the eastern side of the entrance, consists of several rocky islets surrounded by coral reefs; foul ground extends about $1\frac{1}{2}$ cables from the northern side of T'ung-p'an hsiü. She-liao tao and Chung shan are connected together by reefs; foul ground extends nearly 4 cables from the western sides of these two islands, embracing T'ung-p'an hsiü. The north-eastern coast of She-liao tao and the northern side of Chung shan are fringed by a rocky shelf which extends as much as $1\frac{1}{2}$ cables; Wu chiao (U shō), a rock 5 feet (1^m5) high, lies about 2 cables eastward of Chien-shan pi (Senzan bi), the eastern point of She-liao tao, and a sunken rock lies about half a cable north-eastward of Wu chiao. Pa-ch'ih men the narrow

Charts 3658, 1761, 1968, 3236, 2412, 1262, 1263.

Chart 2618.

channel between She-liao tao and the mainland, is only available for boats and junks, and a rock, which dries one foot (0^m3) lies in its narrowest part. There are extensive reclamations on the southern and western sides of She-liao tao; these connect the island to T'ung-p'an hsü, and include two graving docks. A mole projects southward from the south-western corner of She-liao tao, and encloses a fishing harbour where there is extensive quayage. 5

The southern limit of the Outer harbour is a line drawn eastward from the extremity of Hsien-tung-pi breakwater. 10

Lights.—The light on Wan-jen-tui pi (*Lat.*, 25° 09' N., *Long.* 121° 44' E.) is described on page 233.

A light is exhibited, at an elevation of 54 feet (16^m5), from a red octagonal concrete tower, situated at the head of the breakwater extending from Wan-jen-tui pi. 15

A light is exhibited, at an elevation of 54 feet (16^m5), from a white octagonal concrete tower, situated at the head of the breakwater extending from T'ung-p'an hsü.

A light is exhibited, at an elevation of 41 feet (12^m5), from an octagonal concrete structure, 39 feet (11^m9) in height, painted black and white in horizontal bands, situated on the north-western extremity of T'ung-p'an hsü. 20

A light is exhibited, at an elevation of 25 feet (7^m6), from a white circular concrete tower, 20 feet (6^m1) in height, situated on the extremity of the mole enclosing Pa-ch'ih-men fishing harbour. 25

A light is exhibited, at an elevation of 59 feet (18^m0) from a red square column on an octagonal concrete base, 54 feet (16^m5) in height, on the extremity of Hsien-tung-pi breakwater.

Buoyage.—A black can buoy marks the outer edge of a rocky shoal extending south-westward from T'ung-p'an hsü. 30

A black pillar light-buoy, exhibiting a *white flashing* light *every three seconds*, is moored about 2 cables eastward of the light on Hsien-tung-pi breakwater.

A red conical buoy, K, and a red can buoy B2, are moored, respectively, about 1½ cables northward and 2 cables east-north-eastward of the head of Hsien-tung-pi breakwater. 35

Anchorage.—**Prohibited anchorage.**—The best anchorage in the Outer harbour is with T'ung-p'an hsü light-structure bearing 008° distant about half a mile, in depths of from 7 to 9 fathoms (12^m8 to 16^m5), good holding ground. 40

Anchorage is prohibited in a narrow area in the fairway of the Outer harbour, the limits of which are indicated by pecked lines on the chart.

Compass adjustment.—Four beacons, each surmounted by a white triangle, are established for the adjustment of compasses in the Outer harbour. Two are situated on the southern side of the entrance to Hu-hao ao, and are in line, bearing 268°. Another lies about 3 cables eastward of the light at the entrance to Pa-ch'ih men fishing harbour, and is in line with that light, bearing 088°. The fourth lies about 4 cables southward of the light on the breakwater at Hsien-tung pi, and is in line with that light, bearing 178°. 45 50

Inner harbour.—**Shoal.**—**Berths.**—**Depths.**—**Piers.**—Quays are constructed along the whole of the north-western side of the Inner harbour, and also on both sides of Niu-ch'ou chiang (Gyuchō kō), a

Chart 2618.

basin which runs north-westward from the middle of this side of the harbour and has a dry dock at its head. In 1937, a 3½-fathom (6^m9) patch existed in the fairway of the entrance to this basin.

- 5 There are 18 Berths on the north-western side of the Inner harbour with depths, in 1948, of from 17 to 36 feet (5^m2 to 11^m0) alongside.

- Eastward of a position about 2½ cables south-south-eastward of the head of Hsien-tung-pi breakwater (*Lat. 25° 09' N., Long. 121° 45' E.*), the shore of the south-eastern side of the Inner harbour is undeveloped and fringed by reefs. Westward of this position, the south-eastern shore of the Inner harbour is fronted by a slightly sloping retaining wall, alongside which small craft can lie. Two small boat basins are situated in the northern section of the retaining wall, and near its southern end there are two concrete floating piers; the inner one was named by the Japanese Tsushima pier, and the outer one Taishō pier, and each is capable of taking a vessel of 2,000 tons.

Two canalised streams flow into the head of the Inner harbour.

- Mooring buoys.**—There are numbers of mooring buoys in both Outer and Inner harbours, and also in the fishing harbour at the western entrance to Pa-ch'ih men.

Tidal streams.—The tidal streams inside Ch-lung chiang are negligible, and are less than one knot between the breakwaters. It was reported, in 1945, that a counter-current runs just outside the breakwater entrance.

- 25 **Pilotage.**—The pilotage area of Chi-lung chiang lies within lines drawn from the extremity of Yeh-liu pan-tao to the north-eastern point of Chi-lung tao (*Lat. 25° 12' N., Long. 121° 47' E.*), and from the latter point to the north-western point of Chung shan. Application for pilots should be made to the Harbour office, situated on the eastern side of the Inner harbour.

- Pilotage is compulsory. A licensed pilot can be obtained by hoisting the customary signals of the International Code of Signals, or by applying in advance at the Harbour office, stating the expected time of the vessel's arrival. The pilot will board the vessel at the limit of the pilotage area or near the limit of the harbour, but in bad weather it is usual to embark the pilot inside Wan-jen-tui pi. The pilot boat is a white steamboat resembling a yacht, with "Licensed Pilot" in black, displaying the pilot flag (a square flag, the upper half white, lower half red).

- 40 **Regulations.**—Vessels are not at present permitted to enter or leave the port during the hours of darkness.

Vessels entering the port at present must show their signal letters, the quarantine flag, and the Chinese National ensign.

- Harbour facilities.—Supplies.—Communications.**—There are extensive facilities for repairs. Two main dock-yards exist, the principal one on She-liao tao, and the other in Niu-ch'ou chiang.

- There are three dry docks. For the dimensions of the largest, see Appendix I, page 706. There is a patent slip in Niu-ch'ou chiang and numbers of slipways for the repair and construction of small craft in various parts of the harbour.

The main wharves are connected to the railway system. There is a 30 ton and a 10-ton crane, and it was reported, in 1948, that there were at least 10 electric cranes in working order. There is a 30-ton floating crane.

Two tugs were available in 1946.

Charts 3658, 1761, 1968, 3236, 2412, 1262, 1263.

Chart 2618.

Chi-lung chiang is the main coaling port in Formosa, with coal mines situated in its immediate vicinity. Large stocks are normally maintained. Fuel oil is available; there are fuelling points at some of the berths, but, in 1946, supply could only be made in drums. 5

Provisions of all kinds are plentiful. Water can be taken in alongside.

Chi-lung is connected to the railway system on the western side of Formosa, and also with Su-ao (Suō) on the eastern coast. There is regular steamship communication with Japan, the principal ports of 10 China, the Philippines and Java.

There is a radio station at Chi-lung, *see* page 39.

Deratisation.—*See* page 39.

Signal stations.—**Storm signals.**—There are signal stations at Wan-jen-tui pi (*Lat.* 25° 09' N., *Long.* 121° 44' E.), at the southern 15 entrance point to the fishing harbour at Pa-ch'ih men, and on the south-eastern side of the Inner harbour. General storm signals are displayed at the Harbour office; if this station is out of action the signals are displayed from a mast about a quarter of a mile eastward of the Harbour office. 20

Local storm signals are displayed at a flagstaff about half a mile north-eastward of the Harbour office.

Trade.—**Shipping.**—In 1946, the principal exports were coal and sugar; the main imports were fertilisers, flour, mineral oils and 25 industrial raw materials.

In 1946, 236 vessels with a total tonnage of 1,253,000 tons, and about 1,800 small craft of about 63,000 tons entered the port.

Climatic table.—*See* Chapter 1, page 69.

Charts 3658, 3235.

NORTHERN SIDE OF FORMOSA.—**Chi-lung chiang to San-tiao 30 chiao.**—**General remarks.**—From Chi-lung chiang the coast trends generally south-eastward for about 15 miles to San-tiao chiao (Sanchō or Samuchō kaku), the north-eastern point of Formosa. This coast is generally mountainous. There are several islets about 20 to 35 miles off the coast northward of San-tiao chiao. 35

Chart 2618.

Coast.—**Dangers.**—**Anchorage.**—**Lighthouse.**—Between Chien-shan pi (page 234) and Wu-wei-kou pi (Mubikō bi), situated about three-quarters of a mile south-eastward, the coast is fronted by foul ground, on the outer edge of which are situated Wu chiao, described on page 40 234, Tien-chiao chiao (Sproston rocks) and Ta chiao (Parallel rocks).

Pa-tou chiang (Hatto kō) is a small bay entered between Wu-wei-kou pi and Lu-ku-p'ing chiao (Rokohei kaku), situated about half a mile east-south-eastward; it is open northward and is encumbered with rocky shoals, including Lan-t'ou-chiao-wei chiao (Gull rocks), 45 which is 6 feet (1^m8) high.

Chart 3658.

The eastern side of Pa-tou chiang is an island almost connected to the mainland; reefs and rocks extend about one cable from Chien-shan-tzu pi (Kensan kaku), the north eastern point of the island. 50

Shen-ao (Chimuo) wan is a small bay situated about 1½ miles south-eastward of Chien-shan-tzu pi; reefs extend about one cable from both entrance points. Vessels with local knowledge can obtain

Charts 1761, 1968, 3236, 2412, 1262, 1263.

Chart 3658.

anchorage in the centre of the bay, sheltered from all winds except from north-eastward, in depths of from 6 to 7 fathoms (11^m0 to 12^m8). Considerable quantities of ore are exported annually from
 5 this bay, and some mooring buoys, maintained by the mining company, are laid down for vessels taking in cargo ; there is also a wooden pier and a mole.

A prominent round-topped mountain, 1,939 feet (591^m0) high, rises steeply from the coast about one mile east-south-eastward of the
 10 south-eastern entrance point of Shen-ao wan (*Lat.* 25° 08' N., *Long.* 121° 49' E.).

Charts 3235, 3658.

Pi-t'ou chiao (Bitō or Peitau kaku) is a steep cliffy headland, 394 feet (120^m1) high, situated about 5½ miles eastward of the eastern
 15 entrance point of Shen-ao wan, and appears as an island from a distance. A disused lighthouse, consisting of a black iron hexagonal tower, 49 feet (14^m9) in height, stands on Pi-t'ou chiao. A small boat harbour and Pi-t'ou fishing village are situated on its north-western side, and a rock, 16 feet (4^m9) high, lies about 1½ cables
 20 offshore about half a mile westward of its extremity. The lights of a mine near the summit of a mountain, 2,455 feet (784^m3) high, situated about 4 miles south-westward of Pi-t'ou chiao can be seen from a distance of 30 miles in clear weather. About one mile southward of Pi-t'ou chiao is a small bay with a depth of 8 fathoms (14^m6) in
 25 the centre, which affords temporary anchorage, except with easterly winds, to small vessels with local knowledge ; caution must be exercised when entering or leaving, as a rock, which dries 4 feet (1^m2), lies nearly in the middle of the entrance.

The coast between Pi-t'ou chiao (*Lat.* 25° 08' N., *Long.* 121° 55' E.)
 30 and San-tiao chiao (Sanchō or Samuchō kaku), situated about 8 miles south-eastward, is bordered by rocks and shoals to a distance of a half mile in places. Fo-tsu-miao pi (Bussobyō bi) lies about 1½ miles southward of Pi-t'ou chiao, and Ta-hai-ch'ing chiao (Taikaikei shō), a rock one foot (0^m3) high, lies about midway between Pi-t'ou
 35 chiao and San-tiao chiao, with another rock 10 feet (3^m0) high, about three-quarters of a mile southward of it.

Light.—The light on San-tiao chiao is described on page 250.

Chart 3658.

Off-lying islets.—Obstruction.—Dangers.—Hua-p'ing hsü (Kahei
 40 sho), situated nearly 18 miles northward of Pi-t'ou chiao, is a rugged rock, 154 feet (46^m9) high, with black perpendicular sides, surrounded by numerous pointed rocks ; a reef on which the sea generally breaks extends fully one cable from its western side.

Chart 1968.

Mien-hua hsü (Craig islet), situated about 9½ miles north-eastward of Hua-p'ing hsü, is a rocky islet with three rounded peaks, the
 45 easternmost, 180 feet (54^m9) high, being the highest. The southern and eastern coasts consist of precipitous cliffs ; the northern coast is low and rocky, and is indented by a small cove. Close off the
 50 eastern side of the islet is P'ing-feng yen, a prominent pointed rock, 139 feet (42^m4) high ; there is a small black pointed rock on the western side of the islet. The eastern side of the islet is steep-to, but elsewhere there are depths of less than 10 fathoms (18^m3) up to a distance of from 2 to 4 cables offshore. In 1926 the *Tensei*

Charts 3236, 2412, 1262, 1263.

Chart 1968.

maru, with a draught of 23 feet (7^m0), touched an obstruction of unknown character 8½ cables southward of the summit of Mien-hua hsü.

P'eng-chia hsü (Agincourt island), situated about 8 miles northward of Mien-hua hsü, has two rounded peaks, the eastern, 466 feet (142^m0) high, being slightly the higher; there are scarcely any trees on the island, but it is covered with grass and rushes, and there is a breeding ground for mountain sheep. There are a few houses, inhabited by fishermen, on the western coast. The eastern side is steep-to, but on the western and southern sides there are depths of less than 10 fathoms (18^m3) up to a distance of about 3 cables offshore. Ch'ang lai, a rocky shoal, with a depth of 9 fathoms (16^m5) over it, lies about 1½ miles southward of the island.

In 1952, the Chinese warship *Chung-chuan* reported striking a shoal about 15 miles west-south-westward of P'eng-chia hsü.

Light.—A light is exhibited, at an elevation of 477 feet (145^m4), from a white circular brick tower, 86 feet (26^m2) in height, situated on the summit of P'eng-chia hsü (*Lat.* 25° 38' N., *Long.* 122° 04' E.).

Chart 3658.

Local magnetic anomaly.—A local magnetic anomaly was, in 1938, reported in the vicinity of Hua-p'ing hsü.

Chart 3236.

Submarine volcano.—On 18th April, 1916, steam was observed rising from the sea about 40 miles north-north-eastward of P'eng-chia hsü. In June, 1927, some patches of discoloured water, with tide-rips, were seen in the same position; in 1931 and 1937, however, vessels passing this vicinity did not observe anything unusual. According to the report of a fisherman a discoloured patch, about one mile in diameter is frequently observed in spring and summer about 1½ miles north-westward of the position when the steam was seen. Vessels navigating in this area should exercise caution.

Chart 1968.

EASTERN SIDE OF FORMOSA.—General remarks.—The eastern coast of Formosa is steep-to, and mountains rise almost directly from the sea to an elevation of over 4,000 feet (1,219^m2) in places; there are, however, broad plains at T'ai-tung (Taitō) (page 241) and Hua-lien (Karenkō) (page 245), which terminate in sandy beaches at the coast. Within the coastal range of mountains between these two plains is a long, narrow plain watered by three rivers; Pei-nan-ta ch'i (Pinan taikei), which flows southward and discharges into T'ai-tung po-ti (Taitō hakuchi); Hsiu-ku-i ch'i (Shūkoran kei), which traverses the middle part of the range; and Hua-lien ch'i (Karen kei), which flows northward and discharges at Hua-lien.

The coast is little indented, and Su-ao chiang (Suō wan) is the only harbour which affords complete shelter. During the north-east monsoon, especially between November and the end of February, there is usually a heavy sea along the coast, and it is impossible to discharge cargo, though mails and passengers can be landed at Hua-lien. There is railway communication between T'ai-tung and Hua-lien, and between Su-ao and Chi-lung.

Charts 3232, 3233.

Coast.—Dangers.—Anchorage.—Chiang-k'ou (Kōkō) wan is entered

Charts 3804, 2412, 2661b, 1262, 1263.

Charts 3232, 3233.

between O'luan pi (page 197) and Chiang-k'ou pi, (Kōkō bi), situated about 6 miles northward, and affords anchorage with south-westerly winds only. A 13-foot (4^m0) patch lies about 8 cables offshore and
 5 nearly 1½ miles northward of the eastern extremity of O'luan pi (*Lat.* 21° 54' N., *Long.* 120° 51' E.) ; a 19-foot (5^m8) rocky patch lies about 4 cables westward of the 13-foot (4^m0) patch. A rock, 4 feet (1^m2) high, lies about 2 miles northward of the eastern extremity of O'luan pi, and about 1½ cables eastward of this rock is another rock 25 feet
 10 (7^m6) high. The bottom throughout the bay is mostly sand, but there are a few rocky patches, with a least depth of 6 fathoms (11^m0) over them, in the northern part. Chiang-k'ou ch'i (Kōkō kei) flows into the north-western corner of the bay, and the village of Chiang-k'ou (Kōkō) is situated on the northern bank about three-quarters
 15 of a mile within the entrance.

An obstruction, with a depth of 2 fathoms (3^m7) over it, lies close inshore opposite the entrance to Chiang-k'ou ch'i.

Chart 3233.

Ch'u-feng pi (Shuppū bi), situated about 8½ miles northward of
 20 O'luan pi, consists of high cliffs and is visible from a great distance ; some rocks lie close off this point. Nan-jen pi (Nanjin bi) is situated about 4 miles northward of Ch'u-feng pi, with Feng pi (Fu bi) about midway between. An islet lies close off Nan-jen pi, and nearly one cable northward of it is a rock awash ; a rock, 5 feet (1^m5) high, lies
 25 about 3 cables south-eastward of the same point.

Pa-yao (Hachiyō) wan is a slight indentation in the coast between Nan-jen pi and Chiang-tzu pi (Kōshi bi), situated about 2½ miles northward ; it affords anchorage for small vessels with offshore winds. The shore of the bay is a sandy beach backed by prominent
 30 sandhills. Chiang-tzu pi is fringed by rocks to a distance of about a quarter of a mile.

Tan-tzu pi (Tariuke bi), Mu-tan pi (Bōtan bi), and Kuan-yin pi (Kannon bi), are situated, respectively, one, 4, and 5½ miles northward of Chiang-tzu pi. Mu-tan (Bōtan) wan lies close southward of
 35 Mu-tan pi.

Ta-wu ch'i (Taibu kei) flows out about 8 miles northward of Kuan-yin pi ; The town of Ta-wu (Taibu), is situated about half a mile southward of its entrance.

Off-lying islands.—Dangers.—Anchorages.—Lan hsü (Kōtō sho)
 40 lies about 38 miles east-north-eastward of O'luan pi and rises steeply from the sea ; it appears saddle-shaped on northerly and southerly bearings. The island (*Lat.* 22° 03' N., *Long.* 121° 33' E.) has many steep peaks, densely wooded, the highest, named Hung-t'ou shan (Kōtō san), being 1,807 feet (550^m0) high ; there are several streams,
 45 all having plenty of water. There is nearly always a low-lying mist over the island, caused by the high temperature which accompanies Kuro shio or Japan stream ; in winter the island is sometimes obscured by continuous rain, and great caution is, therefore, necessary when approaching, especially at night.

50 The coast of Lan hsü is rocky almost throughout, and numerous pinnacle rocks below water render it unsafe for vessels without local knowledge to approach the coast within one mile.

Chien yen (Yayū iwa), a point on the western coast, situated about 2 miles southward of Chin-pu-chih pi (Shinbuchi bi), the north-

Charts 3804, 1968, 3236, 2661b, 1262, 1263.

Chart 3233.

western point of the island, consists of a peaked rock 308 feet (93^m9) high, connected to the main island by low land and appearing as an islet from a distance. Lo-t'ō yen (Rakuda iwa), an islet composed of several peaked rocks, 144 feet (44^m0) high, lies about half a mile off the north-eastern point of Lan hsü, and between this islet and the coast are several remarkable pillar rocks. 5

There are seven villages on Lan hsü, and the inhabitants are of a mild and pleasant disposition; the women carry out agricultural work, and the men are occupied in fishing. Their huts are merely excavations in the ground covered with thatch and surrounded by stone walls, so only the roofs are visible from outside; there are, however, various sheds two stories high. Skin diseases and malaria are prevalent. The products are mother-of-pearl, pottery, and bananas. 10 15

Pa-tai (Yashiro) wan is a bay on the south-western coast of Lan hsü, and affords anchorage for vessels with local knowledge in its north-western part with northerly winds; the bottom is fine sand, good holding ground. Ch'ung yen (Okino iwa), a pillar rock 27 feet (8^m2) high, lies nearly 4 cables south-westward of the north-western entrance point of the bay, with some sunken rocks between, and is a useful mark when entering. The best anchorage is about 3 cables offshore, in a depth of about 10 fathoms (18^m3), with Ch'ung yen bearing 270°, and the police station, a prominent white building lying about three-quarters of a mile eastward of the north-western entrance point of the bay, bearing 027°. 20 25

Tung-ch'ing (Tosei) wan, situated on the eastern side of Lan hsü, affords safe anchorage to vessels with local knowledge except with easterly winds. The best anchorage is between two villages in the north-western part of the bay, about 3 cables offshore, where the depth is less than 11 fathoms (20^m1), sand. Kuan-tung chiao (Kantō shō), a pinnacle rock, with a depth of 2½ fathoms (4^m3) over it, lies about 7 cables southward of Shih-tzu chiao (Shishi kaku), the northern entrance point of the bay; about three-quarters of a mile south-eastward of this rock is a rocky patch with a least depth of 3½ fathoms (6^m4) over it. 30 35

Hsiao-lan hsü (Shōkōtō sho), 568 feet (173^m1) high, lies about 3 miles south-south-eastward of Wang-nan chiao (Bōnan kaku), the southern point of Lan hsü, and, except on the northern side, is fringed by rocks; a reef extends about 8 cables south-eastward from its southern side. The channel between Lan hsü and Hsiao-lan hsü is deep; vessels using it should keep in mid-channel, so as to avoid the rocks and shoals lying within about a quarter of a mile of Wang-nan chiao (*Lat.* 22° 00' N., *Long.* 121° 35' E.). There are tide rips in this channel. 40 45

For Gadd rock, situated about 13 miles southward of Hsiao-lan hsü, see page 196.

Charts 3233, 3234.

Coast.—From the entrance to Ta-wu ch'i (page 240), the coast trends generally north-north-eastward for about 27 miles to T'ai-tung (Taitō), and is remarkably steep-to. 50

T'ai-tung chiang.—**Anchorage.**—T'ai-tung chiang (Taitō hakuchi) is situated off T'ai-tung (Taitō), which is an important town, with a population, in 1935, of 14,634. Pei-nan-ta ch'i (Pinan taikei) flows 55

Charts 3804, 1968, 3236, 2661b, 1262, 1263.

Charts 3233, 3234.

through the T'ai-tung plain and enters the sea close north-eastward of the town.

The coast in this vicinity is steep-to, and half a mile offshore there are depths of over 40 fathoms (73^m2); there is only a small area immediately off the town, up to about 3 cables offshore, where the depths are suitable for anchoring. Li-yü shan (Rigyo san), a hill which rises to an elevation of 246 feet (75^m0) at the western end of the town, is a useful mark when making the roadstead, and it can usually be identified at a distance of about 15 miles; an electric light on the summit, used for illuminating purposes, is prominent at night.

The best anchorage is with Li-yü shan bearing 297° , in depths of from 7 to 13 fathoms (12^m8 to 23^m8). In the winter, when there is a strong north-east wind, a north-westerly wind always arises in the mornings, which counteracts the effect of the north-east wind and facilitates the landing of cargo. Landing can be effected on the beach nearly half a mile eastward of the town, but care must be taken, as there is a heavy surf.

Tidal streams.—The tidal streams are affected by the drift caused by the wind and by Kiro shio or the north-going current; although their direction is uncertain, the rate is never great.

Chart 3233.

Off-lying island.—Anchorage.—Tidal streams.—Lü tao (Kashō tō), formerly called Huo-shao tao, situated about 17 miles east-south-eastward of T'ai-tung, is a volcanic island with two peaks, 907 and 896 feet (276^m4 and 273^m1) high, respectively; the island is covered with grass and has only a few trees on it. When there is likelihood of a storm the natives light a fire on the summit of the island so as to warn those who are out fishing. The north-eastern extremity of the island is flat, and Lou-men yen (Rōmon iwa), a peaked rock 151 feet (46^m0) high, with a hole in it, lies about 3 cables off this point; about 6 cables east-north-eastward of Lou-men yen is Fei yen (Tobi iwa), a rock 16 feet (4^m9) high. Kuro shio runs strongly off Pi-t'ou chiao (Bitō kaku), the north-western point of the island, and off Fan-sou pi (Pantuon pii), the south-eastern point; whirlpools are formed over a wide area, and at Fan-sou pi (*Lat. $22^\circ 38' N.$, Long. $121^\circ 30' E.$*) the direction of the current is diverted considerably eastward.

There are four villages on the island, with a total population of 1,902 in 1932; the islanders are pure Chinese. The products are peanuts, sweet potatoes, bananas, and lime; cattle are reared, and fish are plentiful. There is only one small stream, on the eastern side of the island; a thermal spring gushes out between the rocks on the south-eastern coast of the island, and it is said to be specially efficacious for skin diseases.

Nan-liao (Nanryō) wan is a slight indentation on the western coast of Lü tao, between Pi-t'ou chiao and Kuei-wan pi (Kuwan bi), situated about 2 miles south-south-eastward; its shore is fringed with coral reefs to a distance of nearly one cable in places, and close outside these reefs there are depths of from 4 to 5 fathoms (7^m3 to 9^m1), increasing to 20 fathoms (36^m6) from 2 to 4 cables offshore. Although not a good anchorage, the bottom being rock and sand, vessels with local knowledge can obtain temporary shelter even with the strong north-east winds of winter. The best position is about a

Chart 3233.

quarter of a mile offshore, in a depth of 13 fathoms (23^m8) with the 907 feet (276^m4) high summit of the island bearing 117°, and the lighthouse on Pi-t'ou chiao, bearing 352°; a rock, with a depth of 2½ fathoms (4^m1) over it, lies nearly 3½ cables southward of this anchorage and 2 cables offshore. The tidal stream always sets northward in this bay, with a maximum rate of about 4 knots, and the anchorage should be approached with the summit bearing 117°. Landing can be effected at a stone mole constructed in a gap in the coastal reef near some radio masts situated about half a mile southward of Pi-t'ou chiao, but caution must be exercised when passing through this gap.

Charts 3233, 3234.

Chung-liao (Chūryō) wan is a slight indentation on the northern coast of Lü tao, between Pi-t'ou chiao and a rocky point, 108 feet (32^m9) high, situated nearly 1½ miles eastward; the shore of the bay is a sandy beach fringed by a coral reef about one cable wide. A rock, with a depth of 5½ fathoms (9^m6) over it, lies about 3 cables north-westward of Pi-t'ou chiao, with foul ground between it and the point. Two rocks, with depths of 3 and 2½ fathoms (5^m5 and 4^m6) over them, lie about 4 and 4½ cables, respectively, north-eastward of Pi-t'ou chiao. A rock awash lies about three-quarters of a mile north-north-eastward of the eastern point of the bay; two rocks, with depths of 4 and 3 fathoms (7^m3 and 5^m5) over them, lie about 2 and 3 cables, respectively, north-westward of this point. Anchorage can be obtained by vessels with local knowledge, about half a mile offshore, in a depth of about 17 fathoms (31^m1), sand and rock.

Light.—A light is exhibited, at an elevation of 154 feet (46^m9), from a white circular concrete structure, 98 feet (29^m9) in height, on Pi-t'ou chiao (Lat. 22° 41' N., Long. 121° 27' E.).

Coast.—**Dangers.**—Between Hou-tzu pi (Keran bi), situated about 2 miles north-north-eastward of the entrance to Pei-nan-ta ch'i (page 241), and Tu-luan pi (Chibaanawai bi), lying about 4½ miles north-north-eastward, the coast recedes and forms Tu-luan (Tsuran) wan; rocks lie off the south-western side of this bay, and also off Tu-luan pi.

From Tu-luan pi, the coast trends about 11 miles north-north-eastward to Tu-li pi (Kataitai pii), and then a further 3½ miles in the same direction to Papiyan pi (pii); this stretch of coast is generally steep-to, but foul ground extends about half a mile offshore about 1½ miles southward of Tu-li pi.

Chart 3234.

Hsin-chiang po-ti.—**Dangers.**—**Anchorage.**—**Light.**—Hsin-chiang po-ti (Shinkō hakuchi), lies between Papiyan pi and Mao-hai pi (Kayakai bi), situated about 2 miles north-eastward; it is open southward, but affords shelter to small vessels with local knowledge from north-easterly winds. The town of Ch'eng-kung (Shinkō) lies close north-westward of Mao-hai pi. A reef, with some rocks above water on it, and a rock awash on its outer end, extends about 3 cables southward from Mao-hai pi and makes a natural breakwater. A spit, with a depth of 2 fathoms (3^m7) over its outer end, extends about a quarter of a mile offshore nearly 7 cables south-westward of Mao-hai pi. Small vessels can anchor, in a depth of 7 fathoms (12^m8), sand, 1½ cables westward of the outer rock, 7 feet (2^m1) high, on the reef extending from Mao-hai pi; large vessels should anchor further

Charts 1968, 3236, 2661b, 1262, 1263.

Chart 3234.

outside. There is a sandy beach on the western side of Mao-hai pi, where landing can be safely effected.

A harbour for fishing craft has been constructed on the western side of Mao-hai pi; it has a depth of 12 feet (3^m7) and is protected by two breakwaters, each about one cable in length, the entrance between them being about a quarter of a cable wide. An oil-tank and an abattoir on the western side of this harbour are prominent.

A light is exhibited, at an elevation of 38 feet (11^m6), from a red circular concrete pillar, 23 feet (7^m0) in height, on the head of the eastern breakwater (*Lat.* 23° 06' N., *Long.* 121° 22' E.).

Coast.—Islet.—Dangers.—Anchorage.—San-hsien-tai (Sansendai) is an islet, with three prominent rocky peaks, lying close off a point situated about 2½ miles north-eastward of Mao-hai pi; the middle and highest peak is 240 feet (73^m1) high. There is no passage between San-hsien-tai and the mainland.

Papayan, a rock, 2 feet (0^m6) high, with a rock awash close off its eastern side, lies about 1½ miles south-westward of San-hsien-tai and nearly half a mile offshore.

Ch'eng-kuang ao (Seikō ō) is a small cove encumbered with reefs situated about 2 miles north-north-westward of San-hsien-tai. The entrance is obstructed by reefs, leaving only a narrow passage available for small craft with local knowledge. There are depths of from 7 to 8 feet (2^m1 to 2^m4) in the northern and southern corners of the cove, and shelter can be obtained here even in the north-east monsoon. Temporary anchorage can be obtained in Ch'eng-kuang-ao po-ti (Seikōō hakuchi), about half a mile off the entrance to the cove, in a depth of 12 fathoms (21^m9) sand.

Foul ground extends about half a mile offshore off Shih-k'ung pi (Chokan pii), which lies about 1½ miles northward of Ch'eng-kuang ao. Wu-shih pi (Ocho pii) and Chia-tsou-wan pi (Kasowan bi) are situated, respectively, about 3 and 9 miles north-north-eastward of Shih-k'ung pi; foul ground extends more than a quarter of a mile offshore in the vicinity of the latter point.

Hsiu-ku-luan ch'i (Shūkoran kei) flows out about 9½ miles northward of Chia-tsou-wan pi, but the entrance is obstructed by sand-banks and there is usually a heavy surf, so that it is impossible for even boats to enter; further inside, however, it is stated that the river is about one cable wide, for a distance of about 10 miles, with depths of over 10 feet (3^m0). About one mile northward of the mouth of Hsiu-ku-luan ch'i is an isolated hill 817 feet (249^m0) high, named Pei-t'ou-ch'i shan (Hokutōkei san), which can be easily identified from a distance; its north-eastern side forms a rocky spur, named Shih-t'i pi (Sekitei bi).

From Shih-t'i pi (*Lat.* 23° 30' N., *Long.* 121° 30' E.), the coast trends north-north-eastward for about 28 miles to the entrance of Hua-lien ch'i (Karen kei); Ta-shih pi (Tācho pii) and Shui-lien pi (Tsuiren pii) are situated, respectively, about 12½ and 16½ miles north-north-eastward of Shih-t'i pi. This stretch of coast is generally steep-to, with rocks close inshore in places. Foul ground extends about half a mile offshore north-eastward of Shih-t'i pi, and also off a point situated about 5 miles further northward. An isolated rock, above water, lies about half a mile offshore about one mile northward of Shih-t'i pi.

Charts 1968, 3236, 2661b, 1262, 1263.

Charts 3234, 3235.

A bar extends across the entrance to Hua-lien ch'i, over which there is usually too much surf for boats to enter. Inside the bar there are depths of over 10 feet (3^m0). Mu-kua ch'i (Mokkui kei) joins Hua-lien ch'i about one mile inside its entrance. 5

Hua-lien po-ti.—Anchorage.—Communications.—Storm signals.—Hua-lien (Karenkō) is a small town situated on the coast about 2 miles northward of the mouth of Hua-lien ch'i, and had a population of 17,042 in 1935. Mi-lun ch'i flows out immediately northward of the town. Mi-lun shan (Biirun san) is an isolated hill, 347 feet (105^m8) high, situated about half a mile northward of the town; it stands up well from the flat land in this vicinity, and is a good mark for making the roadstead. 10

Hua-lien po-ti (Karenkō hakuchi) is the roadstead opposite the town and is entirely open, and can only be used as a temporary 15 anchorage; the safest period is from the end of spring to the middle of summer. The depths in the southern part of the roadstead appear liable to change owing to the sand and mud discharged by Hua-lien ch'i. There is good anchorage with the light structure (*see* below) bearing 309°, distant 6½ cables, in depths of from 9 to 10 20 fathoms (16^m5 to 18^m3) sand. Landing can be effected south-eastward of the light-structure, where there is a sandy beach, but even during fine weather this is difficult; during the north-east monsoon there is a strong north-west wind in the early morning, which reduces the waves and renders landing and the discharge of cargo 25 possible.

There is a radio station (*see* page 39), and the radio mast is prominent from seaward. Small quantities of provisions can be obtained. General storm signals are exhibited on a low hill at the eastern end of the town. 30

Light.—A light is exhibited, at an elevation of 90 feet (27^m4), from a white iron column, 36 feet (11^m0) in height, at Hua-lien (*Lat.* 23° 59' N., *Long.* 121° 37' E.).

Tidal streams.—The tidal streams in Hua-lien po-ti are weak, north-going on the rising tide, and south-going on the falling tide. They slightly increase or decrease the north-going current offshore. 35

Hua-lien chiang.—Breakwaters.—Dangers.—Hua-lien chiang, (Biirun wan), formerly called Karenkō harbour, is an artificial harbour situated about one mile north-eastward of the town of Hua-lien. This harbour is formed by a long breakwater running almost 40 parallel with the coast, and enclosing a basin which can accommodate three vessels of 3,000 tons, as well as smaller craft. A small breakwater extends from the coast opposite the southern end of the main breakwater, and helps to shelter the entrance; immediately southward of it is a small reef, awash. The entrance channel, which is 45 marked by leading lights, described below, had a depth in 1947, of 16 feet (4^m9). An isolated rock, with a depth of 27 feet (8^m2) over it, lies about 3½ cables westward of the southern end of the main breakwater. Foul ground extends about 2 cables off the seaward side of the main breakwater. 50

There are three wharves with a total quayage of about 1,345 feet (410^m0). A crane with a capacity of 30 tons was reported to be available, in 1949. The port is only open to foreign vessels with special permission of the Ministry of Communications. On arrival a

Charts 1968, 3236, 2661b, 1262, 1263.

Charts 3234, 3235.

vessel should display her number in the International Code of Signals and anchor outside to await the pilot and medical inspection. Entry and departure after dark are prohibited.

- 5 **Lights.**—Leading lights are situated near the head of Hua-lien chiang. The front light is exhibited, at an elevation of 34 feet (10^m4), from a green octagonal structure, 29 feet (8^m8) in height; the rear light, at an elevation of 62 feet (18^m9), from a red octagonal structure, 55 feet (16^m8) in height, about 2½ cables north-north-eastward of the front light. These lights, in line bearing 023°, lead into the harbour.

A light is exhibited, at an elevation of 69 feet (21^m0), from a white round concrete tower, 54 feet (16^m5) in height, on the head of the main breakwater.

- 15 Four lights are exhibited from beacons situated on the middle part of the main breakwater and the shore opposite.

- Directions.**—A vessel should approach with the light-structure in Hua-lien bearing 270°, and should not alter course northward to approach the harbour entrance until within from a half to three-quarters of a mile from the shore.

Coast.—Chi-lai pi (Kirai bi) is situated about 3 miles north-eastward of Hua-lien.

Chart 3235.

- 25 Between Chi-lai pi and the mouth of Cho-chi-li ch'i (Takkiri kei), situated about 7½ miles northward, is a bight with depths of over 300 fathoms (548^m6) one mile offshore. The flat plain on which Hua-lien is situated continues along this part of the coast, but becomes considerably narrower.

- 30 Between the mouth of Cho-chi-li ch'i and Su-ao (Suō), situated about 29 miles northward, the depths are great close to the coast, and the mountains rise precipitously from the sea to elevations of from 4,000 to 8,000 feet (1,219^m2 to 2,438^m4); the coast is interspersed with patches of conspicuous red cliffs, and on the slopes of the mountains can be seen the scattered huts of the natives. The only flat land along this part of the coast is at the mouths of the three rivers, Ta-ch'ing-shui ch'i (Taiseisui kei), Ta-cho-shui ch'i (Taidakusui kei), and Ta-nan-ao ch'i (Tainano kei), which flow out about 6½, 12 and 20 miles, respectively, northward of the mouth of Cho-chi-li ch'i. The coast at the entrance to Ta-cho-shui ch'i (*Lat.* 24° 19' N., *Long.* 40 121° 46' E.) is sandy; at ordinary times the mouth of this river is a delta of small streams, but after heavy rains it swells to a large estuary.

- Nan-shan-chiao pi (Nanzankyaku bi) is a rocky point situated about 2 miles north-eastward of the mouth of Ta-ch'ing-shui ch'i. 45 Just within this point is a somewhat isolated mountain 4,536 feet (1,382^m6) high, and as it is seldom obscured by clouds, it can be easily identified. About half a mile northward of the mouth of Ta-nan-ao ch'i is an isolated hill about 200 feet (61^m0) high, named Kuei shan (Kū san).

- 50 Wu-shih pi (Useki bi) is a narrow point projecting from the coast about 3½ miles north-eastward of the mouth of Ta-nan-ao ch'i; it has a conical hill, about 300 feet (91^m4) high, on its extremity, which appears as an island when seen from the northward. Between Wu-shih pi and Wu-yen chiao (Ugan kaku), situated about 3 miles

Charts 1968, 3236, 2412, 2661b, 1262, 1263.

Chart 3235.

northward, the coast recedes and forms a bay in which there are sandy beaches and depths of from 8 to 10 fathoms (14^m6 to 18^m3).

From Wu-yen chiao the coast trends about 3 miles northward to Hou-hou pi (Kōkō bi).

Tidal streams.—The tidal streams off the coast between T'ai-tung po-ti and Su-ao chiang appear to set south-westward and north-eastward, but practically the only effect is that the rate of Kuro shio, the north-going current, is reduced by the south-westerly set of the tidal stream and increased by the north-easterly set.

Charts 3235, 3658.

Su-ao chiang.—**General remarks.**—Su-ao chiang (Suō wan or Soo wan), entered between Hou-hou pi (*Lat. 24° 35' N., Long. 121° 52' E.*) and Pei chiao (Hokkaku), situated about 1½ miles northward, is the only good natural harbour on the eastern coast of Formosa. As this bay is only open south-eastward, it is the best harbour of refuge during the full strength of the north-easterly winds in winter. During summer, however, with south-easterly winds, a long swell from south-eastward sets unto the harbour, causing an unpleasant high breaking sea there; small craft have been wrecked in this harbour, and there is even danger for large vessels if they remain inside at such times.

The southern corner of the bay is named Nan-fang (Namho) wan. A fishing harbour, consisting of two basins, has been excavated in the land at the head of Nan-fang wan; the entrance is protected by two stone moles extending in a north-westerly direction.

Pei-fang wan is a small bay in the north-eastern corner of Su-ao chiang.

The hill close north-westward of Pei chiao is called Pei-fang-ao-hou shan.

In winter landing is always very difficult in Su-ao chiang. During summer there are numerous calm days, and boats can easily land on the shore; when, however, there is a strong south-east wind in the early morning there is such a heavy sea on the shore that communication is impossible, and landing can then be effected in Nan-fang wan or Pei-fang wan.

Dangers.—A rocky ledge extends nearly one cable eastward from Hou-hou pi, and a detached rock, with a depth of less than 6 feet (1^m8) over it, lies about 2 cables east-south-eastward of this point. The coast between Hou-hou pi and Pi-tzu t'ou, situated about 7 cables north-westward, is fringed with rocks, which extend as much as 1½ cables offshore; foul ground extends nearly 2 cables northward from Pi-tzu t'ou.

San-hsien-t'ai (Sansentai) is a group of rocks lying eastward of Pei chiao; the westernmost and largest of this group is 94 feet (28^m7) high and lies about 6 cables eastward of Pei chiao. Foul ground extends about 1½ cables south-eastward of this rock, and a rock, with a depth of 2½ fathoms (4^m6) over it, lies about 2 cables south-westward of it. Mi tao, consisting of two rocks, 65 and 35 feet (19^m8 and 10^m7) high, respectively, lies about 2 cables north-eastward of the largest rock. San-hsien-t'ai is covered by the red sector of Pei-chiao light (page 248) between the bearings of 268° and 303°. Foul ground, on which are several rocks which dry and rocks awash, on which the sea generally breaks, extends about 7 cables north-eastward and 5 cables east-north-eastward from Pei chiao. There

Charts 3235, 3658.

is a channel, with depths of over 10 fathoms (18^m3), between the foul ground and San-hsien-t'ai, but it is not recommended owing to the rocky and irregular nature of the bottom. An islet, 94 feet (28^m7) high, lies close inshore between Pei chiao and Pei-fang pi, which is situated about half a mile westward; a rock, above water, lies about one cable southward of this islet.

Chung-hsin-t'ou is a large coral reef lying nearly in the middle of Su-ao chiang; there are several rocks above water on it, and the highest of these, 27 feet (8^m2) high, lies about 4 cables north-north-westward from Pi-tzu t'ou. The passage between Chung-hsin-t'ou and Pi-tzu t'ou is unsafe. Numerous rocks lie between Chung-hsin-t'ou and the shore of the bay south-westward. Serpent rock, with a depth of 2 fathoms (3^m7) over it, lies about 1½ cables north-westward of the highest rock on Chung-hsin t'ou.

A rock, with a depth of less than 6 feet (1^m8) over it, lies nearly a quarter of a mile offshore about 4½ cables north-westward of the highest rock on Chung-hsin-t'ou; foul ground extends nearly 2 cables offshore in places on the northern side of the bay.

Lights.—A light is exhibited, at an elevation of 184 feet (56^m1), from a white square concrete structure, 24 feet (7^m3) in height, on Pei chiao (*Lat. 24° 36' N., Long. 121° 53' E.*).

A light is exhibited, at an elevation of 240 feet (73^m1), from a white iron framework tower situated about 1½ miles westward of Pei chiao. A green sector of this light between the bearings of 289° and 311° marks the channel into Su-ao chiang.

Lights are exhibited, each at an elevation of 16 feet (4^m9), from concrete beacons situated on the heads of the two moles at the entrance to the fishing harbour in Nan-fang wan.

30 Anchorage.—There is safe anchorage for large vessels in all but easterly and south-easterly weather in depths of from 8 to 10 fathoms (14^m6 to 18^m3), sand, between Chung-hsin-t'ou and Pei-fang pi. There is also an inner anchorage for a restricted number of large vessels in a depth of 7 fathoms (12^m8), sand, from one to 2 cables northward of Serpent rock.

There is a well protected anchorage for one or two vessels in Pei-fang wan, in depths of about 5 fathoms (9^m1).

Smaller vessels can anchor under the lee of Chung-hsin-t'ou, in depths of from 3½ to 5 fathoms (6^m4 to 9^m1), sand; it has been reported that a vessel weathered a typhoon here.

Small craft can anchor in Nan-fang wan in all weathers, in a depth of 2 fathoms (3^m7), sand.

Tidal streams.—The tidal streams along the coast in the vicinity of Su-ao chiang set northward with the rising tide, and southward with the falling tide; both have a maximum rate of rather less than one knot.

The north-going current increases the north-going stream and diminishes the other; the centre of the current is about 20 miles offshore. A weak stream sets into Su-ao chiang along its northern shore on the rising tide.

Su-ao.—Su-ao (Suō or Soo) is situated a short distance within the shore at the head of the bay and on the banks of Ch'uan-t'ou ch'i. There was a population of 15,889 in 1935.

The mouth of Ch'uan-t'ou ch'i (*Lat. 24° 36' N., Long. 121° 51' E.*)

Charts 1968, 3236, 2412, 1262, 1263.

Charts 3235, 3658.

is continually changing, and at low water it is difficult for even small boats to enter ; at high water, however, small craft can enter easily and discharge cargo within the mouth. There are long sandy beaches on both sides of the entrance, affording good landing for boats. When landing inside the river mouth boats should use the right bank, as there is a good road to the town from that side. 5

Harbour facilities.—Supplies.—Communications.—All vessels, other than small craft which can use the artificial harbour, must anchor in the bay and discharge by lighter. 10

There are some oil storage tanks, but the supply of oil cannot be relied upon.

Fresh provisions in moderate quantities can be obtained at Su-ao. Water is laid on the quays in the fishing harbour.

Su-ao is connected by railway to Chi-lung, and thence to the railway system on the western side of Formosa. 15

Storm signals.—Local storm signals are displayed from a mast on the northern side of the town.

Coast.—The coast between Pei chiao and the mouth of T'ou-ch'eng ch'uan, situated about $15\frac{1}{2}$ miles northward, consists of a sandy beach with sand dunes about 20 feet (6^m1) high ; behind the sand dunes are broad, fertile, irrigated plains under cultivation. Wu-lao-k'eng ch'i (Burōkō kei) flows out about 3 miles north-westward of Pei chiao, but its entrance is narrow and shallow, and is only available for small craft at high water. 25

Tung-chiang k'ou (Tōkō kō or Kaliwan river) lies nearly 7 miles northward of Pei chiao, and is the estuary of the three rivers Tung-shan ch'uan (Tōzan kawa), Cho-shui ch'i (Dakusui kei), and I-lan ch'uan (Giran kawa) ; it is stated to be about one cable broad, with depths of from 2 to 3 feet (0^m6 to 0^m9), but the depths and the position of the river mouth often change as the result of floods or the action of the sea. Junks can enter the river at high water and proceed to Tung-chiang (Tōkō), a village about three-quarters of a mile within the mouth. A flat-topped sand dune on the northern side of the entrance, and the masts of junks at anchor inside the river, are good marks when approaching the entrance. 35

T'ou-ch'eng ch'uan flows out about 8 miles northward of Tung-chiang k'ou, and has depths of from one to 2 feet (0^m3 to 0^m6), but owing to the strong stream and heavy surf it is frequently difficult for junks to enter even in fine weather and at high water. The town of T'ou-ch'eng (Tōi or Tau) is situated about three-quarters of a mile up the river. 40

Off-lying island and danger.—Anchorage.—Kuei-shan tao (Kisan or Kusoan tō) lies about 6 miles eastward of the mouth of T'ou-ch'eng ch'uan, and rises to a conical peak 1,335 feet (406^m9) high ; there are steep cliffs all round the island, except for portions of the eastern and western coasts. When seen from northward or southward it resembles a tortoise facing eastward ; on Kuei-t'ou an (Kitō gan) (*Lat. $24^{\circ} 50' N.$, Long. $121^{\circ} 58' E.$*), the eastern point, is a pointed summit 791 feet (241^m1) high, representing the head of the tortoise, and from the western end of the island a pebble bank, called Kuei-wei an (Kio gan), extends about half a mile north-westward, representing the tail. Kuei-shan tao is an active volcano, and white vapour may be seen issuing from two or three places on the southern coast ; 50

Charts 1968, 3236, 2412, 1262, 1263.

Charts 3235, 3658.

sulphur rising from the bed of the sea southward of the western extremity of the island may cause a whitish discolouration of the water. There is a village on the western side of Kuei-shan tao, and the inhabitants are occupied in fishing and agriculture. There is a lake on the eastern side of the island. Temporary anchorage can be obtained, in depths of less than 11 fathoms (20^m1), sand, about 2 cables northward of the pebble bank extending from the western side of the island; the tidal streams here are inappreciable.

- 10 Kuei-luan yen (Kiran iwa), situated about 2½ miles southward of the western extremity of Kuei-shan tao, is a group of rocks, with depths of less than 6 feet (1^m8) over them, or which dry, and they are steep-to all round.

Coast.—A short distance northward of the mouth of T'ou-ch'eng ch'uan the mountains approach the coast, which is steep and rocky as far as San-tiao chiao, the north-eastern point of Formosa, situated about 14 miles north-eastward of T'ou-ch'eng ch'uan. Pei-kuan pi (Hokkan bi), Tzu-ts'ai-p'ing (Shisaihei), and Shih-t'i-chiao (Sekiteikyaku) are situated near the middle of this stretch of coast, and Pi-tzu chiao (Bishikyaku) lies about 2½ miles from San-tiao chiao.

San-tiao chiao (Sanchō or Samuchō kaku) rises to a plateau, on the southern side of which is a sharp peak 546 feet (166^m4) high; about half a mile south-westward of this peak is a hill 677 feet (203^m3) high, and about three-quarters of a mile westward of the latter is P'ing-feng shan (Byobu yama), a mountain 1,455 feet (443^m5) high. All of these are prominent and are good landmarks for identifying the cape from a distance.

A rocky ledge extends about 2 cables from San-tiao chiao, and there is a tidal race for about 1½ miles offshore; the cape should, therefore, be given a good berth. Mao-ao (Uō) wan is a small bay on the northern side of San-tiao chiao, and it affords shelter to small vessels with local knowledge with westerly winds; the depths decrease gradually from 11 fathoms (20^m1) at the entrance, but rocks, which dry, extend for a short distance from the western shore. Mao-ao village is situated at the head of this bay.

Lights.—A light is exhibited, at an elevation of 33 feet (10^m1) from a post at Ta-ch'i (Taikei or Toakei) situated about 8½ miles south-westward of San-tiao chiao. This light was reported, in 1946, to be destroyed.

- 40 A light is exhibited, at an elevation of 330 feet (100^m5), from a white circular concrete structure, 52 feet (15^m8) in height, on San-tiao chiao (*Lat. 25° 01' N., Long. 122° 00' E.*).

Tidal streams.—Vessels proceeding northward off the eastern coast of Formosa may expect abrupt changes in the rate and direction of the current after passing San-tiao chiao.

Charts 1968, 3236, 2412, 1262, 1263.

CHAPTER V.

PEI-LING-SSU TSUI TO HSIANG-SHAN CHIANG.

Chart 1988.

SAN-TU AO AND APPROACHES.—Coast.—Islands and dangers.—Anchorages.—Tidal streams.—The approach to San-tu ao (inlet) lies between Pei-ling-ssu tsui, described on page 162, and Shih chiao (Stone point), situated about 19 miles north-eastward.

From Pei-ling-ssu tsui, the coast trends west-south-westward for about 4 miles, and then turns north-north-westward for about 11 miles to the entrance to San-tu ao. The entrance to Lo-yüan wan (bay), which is described on page 253, lies about $7\frac{1}{2}$ miles north-westward of Pei-ling-ssu tsui.

P'o lieh-tao or Rag islands are the outermost of several islets situated off the coast between Pei-ling-ssu tsui and the entrance to Lo-yüan wan. The easternmost of the three islands of P'o lieh-tao lies about 3 miles north-westward of Pei-ling-ssu tsui. Anchorage can be obtained by vessels with local knowledge westward of the western island, but the depths appear to be very irregular. A rock, with a depth of 5 fathoms (9^m1) over it, lies about half a mile westward of the western island. Bittern rock (*Lat.* $26^{\circ} 26' N.$, *Long.* $119^{\circ} 55' E.$), which dries, lies about one mile northward of the eastern island.

The tidal streams off Pei-ling-ssu tsui and amongst P'o lieh-tao sometimes attain a rate of 3 knots. Fishing stakes may be encountered extending north-eastward from the eastern island of P'o lieh-tao.

From Ch'ien chiao (Chown point), situated on the eastern side of the entrance to San-tu ao, and about $9\frac{1}{2}$ miles north-north-westward of Pei-ling-ssu tsui, the coast trends about 4 miles north-eastward to K'uo-k'u-shih chiao (Cox point), and is rugged. Between K'uo-k'u-shih chiao and Beith point, situated about 5 miles north-eastward the coast has only been partially examined. From Beith point, the coast trends east-north-eastward for about $6\frac{1}{2}$ miles to Shih chiao. Sphinx head, a conspicuous boulder 1,512 feet (460^m9) high, lies about $2\frac{1}{2}$ miles north-eastward of Beith point.

Wu hsü or Yin-sha-i-te tao (Inside islet) lies about $1\frac{1}{2}$ miles east-south-eastward of K'uo-k'u-shih chiao, and is 295 feet (89^m9) high; foul ground extends nearly one mile eastward from it, with rocks drying from 6 to 15 feet (1^m8 to 4^m6) at its outer end. Huang-kuan tao or Hsiao-hsi-yang shan (Isthmus island), also known as I-ssu-ma-ssu tao, lies with its south-western extremity nearly $1\frac{1}{2}$ miles

Charts 1754, 1761, 2412, 1262, 1263.

Chart 1988.

5 south-eastward of Wu hsü, and is divided into two parts by a sandy isthmus; the northern part is 331 feet (100^m9), and the southern 282 feet (85^m9) high. Mud banks, with depths of less than 3 fathoms (5^m5) over them, extend about half a mile westward and eastward from Huang-kuan tao. The channel between Huang-kuan tao and the foul ground eastward of Wu hsü is deep and clear.

Hsiao-an shui-tao (Season channel), situated between Shih chiao and Fu-ying shan (Double Peak island), described on page 253, is 10 deep and clear. Fu-la-hsiao tao (Flat island), 164 feet (50^m0) high, lies about 2½ miles south-westward of Shih chiao and 4 cables off-shore; two rocks above water and a rock drying 7 feet (2^m1) lie close off its south-western point. There is a small islet, 4 feet (1^m2) high, between Fu-la-hsiao tao and the coast, and this passage should 15 not be attempted. In the north-east monsoon small vessels with local knowledge can obtain sheltered anchorage off a sandy bay in the coast about 1½ miles north-westward of Fu-la-hsiao tao (*Lat.* 26° 37' N., *Long.* 120° 06' E.).

Off-lying islands and dangers in the approach to San-tu ao.—Hei yen 20 situated about 7 miles eastward of Pei-ling-ssu tsui, has been described on page 166; a rock, awash, (chart 1754) lies about 6 miles east-north-eastward of Hei yen.

Chui shan or K'uei shan (Cony island), situated about 11½ miles north-eastward of Pei-ling-ssu tsui, rises in a cone to an elevation 25 of 767 feet (233^m8); a reef extends about 1½ cables northward from its northern point. Nan-niu, a rock drying 5 feet (1^m5), lies about 2 cables eastward, and Pan-yang chiao, a dangerous sunken rock, about one mile south-eastward of Chiu shan. A rock, with a depth of 2½ fathoms (5^m0) over it, lies off the western side of the island. 30 Chih-chu tao or Ta-hsi-yang shan (Spider island), 721 feet (219^m8) high, lies with its north-eastern extremity about 3½ miles west-north-westward of Chiu shan. Three islets lie close together a short distance off the eastern side of Chih-chu tao; the northern is named Heng hsü (Puo-tau seu); the middle, Yang hsü, is 154 feet (46^m9) 35 high; the southern, Nan-yang hsü, is 147 feet (44^m8) high. Ts'ao hsü (Chau seu), a small islet 101 feet (30^m8) high, lies about 3 cables northward of the north-eastern point of the island, with Nan-niu-ts'ao hsü, drying 21 feet (6^m4), about a quarter of a mile east-north-eastward, and a rock, drying 12 feet (3^m7) between. Niu-shih chiao and 40 Erh-chien yen are small rocks lying a short distance off the southern and south-western sides of the island, respectively. There are fishing stakes in the area southward of the island.

Ma-an tao, 239 feet (72^m9) high, lies about midway between Chih-chu tao and Huang-kuan tao, which was described on page 251. 45 The channel between Ma-an tao and Huang-kuan tao (*Lat.* 26° 33' N., *Long.* 120° 00' E.) is clear and has been examined by sweeping. The channel between Ma-an tao and Chih-chu tao is obstructed by Pan-ch'ao yen (Half-tide rock), which dries from 2 to 8 feet (0^m6 to 2^m4).

50 O-lieh yen (Larva rocks) consists of several rocks above water and some drying rocks; the south-eastern rock, Ch'e-pa yen, lies about 1½ miles westward of the south-western point of Chih-chu tao, and is 114 feet (34^m8) high. Tung hsü, 141 feet (43^m0) high, is the largest of the group, and lies about half a mile north-westward of Ch'e-pa

Charts 1754, 1761, 2412, 1262, 1263.

Chart 1988.

yen. Groups of rocks lie, respectively, about half a mile north-north-eastward and one mile north-westward of Tung hsü; the former includes a rock 2 feet (0^m6) high, and the latter a rock 98 feet (29^m9) high named Szu-t'ui hsü.

The channel between O-lieh yen and Chih-chu tao has been examined by sweeping.

Fu-ying shan or Shuang-feng tao (Double Peak island) lies with its south-western extremity about 3½ miles north-eastward of Chih-chu tao; it has two remarkable peaks near its north-eastern end, the highest, T'ien-hu ting (Double peak) being 1,194 feet (363^m9) high. Pei-mao-ts'ao hsü (Channel rock), 59 feet (18^m0) high, lies nearly three-quarters of a mile north-westward of the western point of Fu-ying shan, and a rock, above water, lies about one cable off the north-western coast of the island and nearly one mile eastward of Pei-mao-ts'ao hsü. There are depths of less than 5 fathoms (9^m1) for nearly one mile south-westward of Fu-ying shan. Ni-ku hsü (Na-geu seu) is an island, 725 feet (221^m0) high, lying off the south-eastern side of Fu-ying shan. Ma-shih tao or Ma-chick, 839 feet (255^m8) high, lies south-westward of Ni-ku hsü; depths of less than 5 fathoms (9^m1) extend for about one mile from its western side. In the north-east monsoon good anchorage can be obtained south-westward of Fu-ying shan, sheltered from easterly swell by Ma-shih tao and Ni-ku hsü.

The passage between the shoal which extends south-westward from Fu-ying shan and the islets and rocks close off the north-eastern end of Chih-chu tao has been examined by sweeping.

There are fishing stakes in the channels between the off-lying islands and the mainland.

Light.—A light is exhibited, at an elevation of 142 feet (43^m3), from a white circular tower, 53 feet (16^m2) in height, situated on Nan-yang hsü, the southernmost of the three islets (*Lat.* 26° 31' N., *Long.* 120° 04' E.) off the eastern side of Chih-chu tao; the keepers' dwelling is white.

Lo-yüan wan.—**Islands and dangers.**—**Anchorage.**—The entrance to Lo-yüan wan (bay) lies between South point, situated about 7 miles north-westward of Pei-ling-ssu tsui, and Mouth point, lying about one mile northward. Within these points the entrance channel, known as K'o-men Chiang, extends for about 4½ miles west-south-westward; it is deep, and its steep shores are about a mile apart; the bay then opens out into a large shallow basin, through which a channel leads north-westward to the town of Lo-yüan, and another channel leads to the south-eastern corner of the basin. Lo-yüan wan affords anchorage in a typhoon.

Kuang-lai yen or Huang chiao (Half-tide rocks), which dry from 11 to 15 feet (3^m4 to 4^m6), lie about 1½ cables off a point on the northern shore situated about one mile west-south-westward of Mouth point. Yüan-t'ien chiao (Cromlech head), a prominent headland on the southern shore opposite Kuang-lai yen, is steep-to, but there are tide-rips off it. Black peak, also known as Ma-ti shan, is 859 feet high and lies about half a mile south-eastward of Yüan-t'ien chiao.

Twin islets, also known as Tan hsü, lie in mid-channel about 2½ miles inside the entrance, and are almost connected to each other;

Chart 1988.

there are tide-rips off their eastern end. Chih-chih-ch'i shan (Sugar-loaf) is a hill, 449 feet (136^m9) high, on the northern side of the entrance channel opposite Twin islets. Mount Carey, 1,260 feet
 5 (384^m0) high, lies about 1½ miles north-north-westward of Chih-chih-ch'i shan. Chu-tzu chiao (Komen point), and Chi-t'ien chiao (Windward point) are situated on the northern shore westward of Chih-chih-ch'i shan. Discoloured water has been reported in the entrance channel about one mile above Twin islets. Hsiao-ch'uan tao (Snake
 10 islet) lies close off the southern shore about 3¼ miles inside the entrance; Achin head lies about 2½ miles west-south-westward of Hsiao-ch'uan tao, with Ying-ching tao or Pien-fu hsü (Green islet) about midway between and on the edge of the coastal bank. Tree point lies about three-quarters of a mile south-westward of Achin
 15 head. Hsia hsü (Sauh) is the northernmost and largest of several islands lying westward of Tree point; further westward is a group of islets called Cyclades, of which the northern is Li tao (Goblin islet). Nesneros point, also known as Ma-tou shih, is situated on the western side of the basin about 2½ miles west-north-westward of Li tao
 20 (*Lat. 26° 22' N., Long. 119° 43' E.*).

Fushow channel, also known as Kang-hsü Chiang-tao, the entrance to the channel leading to Lo-yüan, lies between Kang hsü (Sunset island), 174 feet (53^m0) high, situated about 1½ miles westward of Hsiao-ch'uan tao and the coast north-eastward; a rock, with a
 25 depth of 5 fathoms (9^m1) over it, lies nearly in the middle of this channel. Friday island, also known as Niao hsü, lies about half a mile north-westward of Kang hsü.

Chi-lung hsü or San-chiao tao (Triangle island), 341 feet (103^m9) high, lies on the north-eastern side of the basin about 2 miles north-
 30 north-westward of Friday island, and Lung-t'ien yen (Pool rock) lies about one cable offshore about half a mile further westward. Black Saddle is a hilly promontory situated about 3 miles north-westward of Chi-lung hsü.

At the north-western corner of the basin there is an indentation
 35 which is shallow, and, through which the channel leads to the town of Lo-yüan; this is entered between Black Saddle and Yüan-t'eng ch'i (North-west point), situated on the western side of the basin about 2 miles south-westward. Sung-yung chiao (Seaweed point) and Chih-t'ien chiao (Curlew point) lie on the northern side of this
 40 indentation, and Causeway island is the largest of a number of islands with which it is encumbered.

The part of the channel close westward of Black Saddle is known as Junk anchorage.

There is anchorage, in depths of from 6 to 7 fathoms (11^m0 to
 45 12^m8), about 8 cables south-south-westward of Kang hsü. Anchorage can also be obtained in the channel leading to Lo-yüan, in depths of from 4 to 5 fathoms (7^m3 to 9^m1), about one mile north-north-westward of Friday island; small vessels can anchor off the north-eastern shore of the basin, up to a distance of about 6 miles north-
 50 westward of Friday island, in a depth of not less than 4 fathoms (7^m3), or in 3½ fathoms (6^m4) about three-quarters of a mile eastward of Chih-t'ien chiao (*Lat. 26° 28' N., Long. 119° 36' E.*).

Local magnetic anomaly.—A local magnetic anomaly has been reported in the vicinity of the entrance to Lo-yüan wan.

Charts 1754, 1761, 2412, 1262, 1263.

Charts 2292, 1988.

San-tu ao.—**General remarks.**—The entrance to San-tu ao (inlet), between the coast northward of Lo-yüan wan and the south-western end of the peninsula of Tung-chung, is about $1\frac{1}{2}$ miles wide. At the inner end of the entrance channel the inlet opens out into a basin, encumbered by islands, from which several arms extend. Waterwitch channel leads westward to San-tu yang (anchorage), beyond which are shallow channels leading to Ning-te (Nintai), the principal town in this neighbourhood. Aurora channel leads to the central and eastern parts of the basin. Algerine roads lie on the eastern side of the basin and further north-eastward is San-tu nei-ao (Sam-sa basin), the two being connected by Bowring channel. The main fairway in the centre of the basin leads north-westward and eventually divides into three narrow channels named Somerville channel, Weigall channel and Yen-t'ien chiang (Trinity channel), respectively.

San-tu ao affords anchorage in a typhoon. With easterly winds and a strong out-going stream, vessels of much draught become tide-rode, particularly during the intervals between the heavy squalls, and a nasty sea sets in; the holding ground is good.

The land around the inlet is well cultivated and the hills are terraced. Two rivers flow into the northern side of the inlet; the eastern of these, which discharges into Yen-t'ien chiang, leads to the village of Yen-t'ien (Sieng-dieng), the seaport of Hsia-p'u (Funing-fu), which is situated about 8 miles eastward, and overlooks Fu-ning wan (bay) (page 263); the western river, named Chiao ch'i (Fuan river), discharges into Weigall channel, and leads to Fu-an city.

Entrance channel.—**Island and dangers.**—**Beacon.**—**Tidal streams.**—The western side of the entrance, between Steep point, situated about 2 miles northward of Mouth point, and Town point, lying about $4\frac{1}{2}$ miles further northward, is rugged and indented by several inlets, mostly filled with mud flats.

Chart 2292.

Deng ao (o) is a bay situated immediately southward of Town point; there is a village, named Chieng-chiang, on the northern side of a stream which flows into the south-western corner of the bay.

Mount Foster, situated about midway between Steep point and Town point, is a prominent sharp summit, 1,482 feet (451^m7) high. Johnston ranges, a little further inland, are rugged, many of the summits being inaccessible; the valleys between the ranges are cultivated. Alacrity range, situated westward and north-westward of Deng ao, is high and broken, Pai-ma shan (Mount Underwood), 3,090 feet (941^m8) high, situated about 5 miles westward of Town point, being the highest peak. Town point is the steep-to extremity of a peninsula rising to its greatest elevation in Mount Davy, 1,210 feet (368^m8) high, situated about 2 miles north-westward of the point.

Ch'i-en chiao (page 251), situated about 4 miles north-eastward of Steep point (chart 1988), is the southern extremity of the peninsula of Tung-chung and the eastern entrance point to San-tu ao. From Ch'i-en chiao (Lat. $26^{\circ} 31' N.$, Long. $119^{\circ} 53' E.$), the coast trends about 2 miles westward to San-sha chiao (Sam-sa point), and then one mile north-westward to Castle point; this stretch of coast is rugged and steep-to, and the tidal streams are felt but little near the greater part of it. Castle point is steep-to; a bay on its south-eastern side is

Charts 1754, 1761, 2412, 1262, 1263.

Chart 2292.

filled with mud. The tidal streams off this point attain a rate of from 4 to 7 knots, and there are generally heavy tide-rips off it, especially with the out-going stream. The coast between Castle
 5 point and Ridge point, situated about $3\frac{1}{2}$ miles northward, is indented with inlets which are filled with mud flats; the valleys behind the head of each inlet are cultivated. Fort bay, with a village, named Tung-chung-k'ou, on its southern shore, is the second bay northward of Castle point. Mount Hsing-ting, situated about $1\frac{1}{2}$ miles eastward
 10 of Castle point, is 1,515 feet (461^m8) high and has a flat top, on which are several large boulders.

Channel rock, situated about 6 cables westward of Castle point, dries 14 feet (4^m3); a black iron beacon, surmounted by a black sphere, 8 feet (2^m4) in height, stands on this rock. The highest peak
 15 of Yen tao (Ching san) (*see below*) in line with Hail point, the western extremity of Chi-chiao shan (*see below*), bearing 336° , leads in mid-channel between Channel rock and Castle point; this leading line leads over the rock, with a depth of 5 fathoms (9^m1), over it lying about half a mile westward of the western island of P'o lieh-tao
 20 (chart 1988 and page 251).

Chi-chiao shan (Cone island), 577 feet (175^m9) high, lies with Hail point, its western extremity, about one mile northward of Town point, and has a rugged appearance; some rocks, which dry from 2 to 18 feet (0^m6 to 5^m5), lie close off its northern coast. Steeple rocks,
 25 60 feet (18^m3) high, lie about $1\frac{1}{2}$ cables off the south-eastern point of the island, and some rocks, which dry 25 feet (7^m6), lie about the same distance south-south-eastward of Steeple rocks.

An islet, 160 feet (48^m8) high, lies about 8 cables eastward of Chi-chiao shan and close off the eastern side of the entrance; a rock,
 30 4 feet (1^m2) high, lies about a quarter of a mile northward of this islet.

The channel westward of Chi-chiao shan is deep and clear, and the points on either side are fairly steep-to; at spring tides the tidal streams may attain a rate of from 6 to 7 knots, and there are tide-rips
 35 and swirls off Hail point (*Lat.* $26^\circ 34' N.$, *Long.* $119^\circ 48' E.$).

Aurora channel, situated eastward of Chi-chiao shan, is also deep.

Waterwitch channel.—Dangers.—Buoy.—Yen tao or Ch'ing shan (Ching san), which forms the northern side of Waterwitch channel, is the second largest island in San-tu ao, and lies with its southern
 40 extremity nearly $2\frac{1}{2}$ miles north-westward of Hail point; it has several peaks of nearly the same elevation, the highest, 1,265 feet (385^m1), lying in the western part. Hei-hsin-k'u tao (Ngu-uong island), 238 feet (72^m5) high, is separated from the eastern part of the southern side of Yen tao by a channel about $3\frac{1}{2}$ cables wide,
 45 which affords anchorage for junks. A rocky islet, 105 feet (32^m0) high, lies on the outer edge of a shoal which extends about half a mile north-eastward from Hei-hsin-k'u tao.

The coast of the mainland, which forms the south-western side of Waterwitch channel, is indented by numerous inlets filled by mud
 50 flats. Mount Three Crag, situated on the mainland at the western end of the channel, is 1,390 feet (423^m7) high and has three sharp crags on its summit.

The south-eastern part of Waterwitch channel is free from dangers, except for Vivian rock, with a depth of $1\frac{1}{2}$ fathoms (2^m7) over it,

Charts 1988, 1754, 2412, 1262, 1263.

Chart 2292.

which lies about $2\frac{1}{2}$ cables south-eastward of the southern point of Yen tao. There are several islets and dangers in the north-western entrance of the channel. Foul ground, with very irregular depths, extends about 3 cables from the south-western coast of Yen tao; 5
Pillar rocks, which lie about 3 cables off this coast, are granite boulders 20 feet (6^m1) high, and a ledge of flat rocks extends about one cable south-westward from them, the outer extremity being awash. Shih-men tao (Diver islet), 35 feet (10^m7) high, is situated about $4\frac{1}{2}$ cables westward of Pillar rocks, and is the outermost of a group of islets 10
lying on the south-western side of the channel; a group of rocks, one of them being one foot (0^m3) high, lies about one cable northward of Shih-men tao.

Kaiser rock, situated about $5\frac{1}{2}$ cables north-westward of Shih-men tao, is just awash at lowest low water and is steep-to; it is marked by 15
a black conical buoy. The tidal streams eddy round this rock at a great rate. The north-eastern point of Chi-chiao shan in line with the south-western side of Yen tao, bearing about 125° , leads about 2 cables north-eastward of Kaiser rock.

The fairway of Waterwitch channel is deep; in the narrowest 20
part, between Shih-men tao and the rocky ledge which extends from Pillar rocks, the tidal streams are strong and there are tide-rips and swirls; the out-going stream sets towards Shih-men tao (*Lat. $26^\circ 37'$ N., Long. $119^\circ 45'$ E.*).

San-tu tao and Granville channel.—San-tu tao (island), the largest 25
island in San-tu ao, lies with its eastern end about 3 miles northward of the western end of Yen tao, and with King point, its south-western extremity, about $5\frac{1}{2}$ miles further west-south-westward. The island is well populated, wooded and cultivated. Mount MacAllum, its highest peak, situated at the north-western end, is 1,476 feet (449^m9) 30
high. Mount Stevens, 1,205 feet (367^m3) high, and Fir Tree hill, 810 feet (246^m9) high, are situated, respectively, about $1\frac{1}{2}$ and $2\frac{1}{2}$ miles eastward of King point. Mud flats extend as much as $1\frac{1}{2}$ miles off the south-eastern side of the island between Hecla point, situated about $2\frac{1}{2}$ miles eastward of King point, and its eastern extremity; 35
Mud islet, 30 feet (9^m1) high, lies on their eastern edge. The islets off the northern side of San-tu tao are described on page 261.

Granville channel lies between San-tu tao and Yen tao. A bank, with less than 3 fathoms (5^m5) over it, extends south-eastward from the eastern end of San-tu tao to within half a mile of the northern 40
side of Yen tao. The passage between the extremity of this bank and Yen tao is obstructed by an islet, 25 feet (7^m6) high, in its centre, and by foul ground, with rocks awash and above water, north-eastward of the islet.

San-tu yang.—**Dangers.**—**Light.**—**Storm signals.**—**Cable.**—San-tu 45
yang (anchorage), sometimes known as the Port of San-tu-ao, lies between the western part of San-tu tao and the mainland southward, and has depths of from $5\frac{1}{2}$ to 17 fathoms (10^m1 to 31^m1).

Apex point, situated on the southern side of the anchorage and nearly 4 miles westward of Shih-men tao, is the north-western 50
extremity of a bluff which rises to an elevation of 878 feet (267^m6); on the southern side of the bluff is Cascade bay, a mud creek in which the village of Chao-t'ou (Chu-tau-pi) is situated, and at the head of which is a small river fed from a waterfall 300 feet (91^m4)

Chart 2292.

high. The village of Hsin-yao or Wan-yao is situated about $1\frac{1}{2}$ miles south-westward of Apex point.

Customs point, situated about 4 cables eastward of King point, has
5 a Custom house on it. Storm signals were formerly displayed from the flagstaff of the Custom house and may still be in use; see Supplementary storm signals (page 27). There is a stone jetty and a pier at Customs point.

A light is exhibited from the head of the pier on Customs point.
10 The town of San-tu lies close north-eastward of Customs point, on the western side of an inlet nearly filled by a mud flat.

Lay rocks are a group of rugged rocks which dry about 20 feet (6^m1); a rounded boulder, 3 feet (0^m9) high, lies on their southern edge and nearly $2\frac{1}{2}$ cables south-eastward of Customs point. At low water
15 these rocks appear like a small island; there are irregular depths for about a quarter of a mile westward and south-westward of them.

Kan-lan hsü (Olive island), 124 feet (37^m8) high, lies about $6\frac{1}{2}$ cables westward of King point and on the south-eastern extremity of Sheldrake flats. Sampan islet, 40 feet (12^m2) high, lies nearly one
20 mile northward of King point and on the edge of the mud flat which extends from the western coast of San-tu tao.

The least depth in the approach to the anchorage from eastward is $4\frac{3}{4}$ fathoms (8^m7) situated about 7 cables south-south-eastward of Hecla point.

25 The best position for anchoring is about half a mile south-eastward of Customs point, in depths of from 8 to 10 fathoms (14^m6 to 18^m3), with King point just open northward of Lay rocks, bearing 293° , and Mount Stevens, bearing 043° . A submarine cable crosses the channel between Customs point and Apex point. See page 37.

30 San-tu is connected with the general telegraph system. There is telephone and steamer communication with Fu-chou.

Very small quantities of fuel oil and petrol are available.

Chart 1988.

Ning-te and approaches.—Islands.—Fei-luan (Fe-lo-on), a village
35 situated about 5 miles south-westward of Apex point (*Lat.* $26^\circ 37' N.$, *Long.* $119^\circ 40' E.$), is situated on a creek with mangroves at the head, and Erh-tu (Nedu) village is about 2 miles north-north-westward of Fei-luan. Mount Wicks, 1,653 feet (503^m8) high, lies close westward of Erh-tu. Ning-te (Nintai), a walled town, is situated about $4\frac{1}{2}$
40 miles north-westward of Erh-tu, and can be reached from San-tu yang by two channels through the mud flats which almost fill that portion of San-tu ao which lies westward of Apex point. Pagoda creek, the southern of these two channels, is only navigable by boats one hour after low water; Ning-te shui-tao (Nintai channel), the
45 northern, is wider and deeper, and is used by junks, but the western part is no deeper than Pagoda creek, and junks always ground off Ning-te.

Pagoda island, 342 feet (104^m2) high, lies about one mile eastward of Ning-te and has a pagoda, 60 feet (18^m3) in height, on its summit.
50 The southern side of the island is connected to the mainland by a causeway, and on the northern side are the remains of an old causeway curving northward; the area thus enclosed is filled up with mud. Two islets, 110 and 50 feet (33^m5 and 15^m2) high, respectively, lie north-eastward of Pagoda island and on the southern side of Ning-te shui-tao.

Charts 1754, 2412, 1262, 1263.

Chart 1988.

The two Hump islands, 425 and 240 feet (129^m5 and 73^m1) high, respectively, lie about one mile south-eastward and one mile southward, respectively, of the eastern end of Pagoda island; they lie, with Pagoda island, on the mud flat separating Pagoda creek from Ning-te shui-tao, and this flat extends about 3 miles eastward from them, under the name of Tongue flat. 5

Spider island, 851 feet (259^m4) high, situated on the northern side of Ning-te shui-tao, is extensively cultivated and it contains many villages, the largest being Tung-wan and Parquan. Red hill, 460 feet (140^m2) high, rises at its south-eastern end. 10

Chart 2292.

Algerine roads.—Islands and dangers.—Anchorage.—The north-western coast of the peninsula of Tung-chung between Ridge point (page 256) and Pu-lo-wu chiao (Plover point), situated about 4 miles north-eastward, is slightly indented, and wooded spurs from De la Garde range, which rises a short distance inland, descend steeply to the coast. Four islets lie on the mud flat which extends about 2 cables from the coast midway between Ridge point and Pu-lo-wu chiao, and a rock, with a depth of 1½ fathoms (3^m2) over it, lies about 2½ cables north-westward of the north-eastern islet. A brownish rock, 20 feet (6^m1) high, from which a rocky reef extends about 1½ cables north-eastward, lies 1½ cables north-westward of Pu-lo-wu chiao; a rock, 6 feet (1^m8) high, lies about three-quarters of a cable north-eastward of the point. 25

The peninsula of Tung-chung is rugged and broken in character, and masses of granite are piled up on the hills; it is connected to the mainland by a narrow, hilly isthmus. Mount Black, 1,077 feet (328^m3) high, is situated about 2 miles east-north-eastward of Ridge point. 30

Algerine roads, situated westward of Pu-lo-wu chiao, afford good anchorage; this is the best position in San-tu ao to ride out a typhoon. A good position for anchoring is about 1½ miles westward of Pu-lo-wu chiao, in a depth of about 12 fathoms (21^m9).

Ling-shui chiao (Foul point) (*Lat.* 26° 39' N., *Long.* 119° 52' E.) is situated on the northern side of the roads and about 2½ miles north-westward of Pu-lo-wu chiao; Slade range runs northward from Ling-shui chiao. A small islet lies close off the point, and foul ground extends nearly 4 cables southward from the islet; another islet, with a rock 14 feet (4^m3) high off its western side, lies about half a mile eastward of the point. 40

San-tu nei-ao and approaches.—Islands and dangers.—Spike hill, situated nearly 3½ miles east-north-eastward of Pu-lo-wu chiao, is situated on the south-western extremity of Spike island, which is nearly connected to the coast. A broad mud flat, with a well defined outer edge, extends from the coast between Pu-lo-wu chiao and Spike island; there are several islands on this mud flat. 45

Blackburn islets, four in number and from 25 to 78 feet (7^m6 to 23^m8) high, lie about half a mile outside the edge of the above-mentioned mud flat; the south-western and largest islet lies about 1½ miles north-eastward of Pu-lo-wu chiao, and the north-eastern islet lies about three-quarters of a mile west-south-westward of Spike hill. 50

Low island, 90 feet (27^m4) high, lies with its eastern extremity

Chart 2292.

about $1\frac{1}{2}$ miles westward of Spike hill ; a rock, 40 feet (12^m2) high, with foul ground extending about 3 cables north-eastward from it, lies about one mile west-south-westward of the north-western point
5 of the island. There is a safe channel northward of Low island, and also between this island and Blackburn islets.

Chih-hsing-ch'ih tao (Sibbald island), 891 feet (271^m6) high, lies with its south-eastern extremity about $1\frac{1}{2}$ miles north-westward of Spike hill ; an islet, with a flat extending about one mile south-south-
10 westward from it, lies close off the eastern side of the island.

Charts 2292, 1988.

San-tu nei-ao or Sam-sa basin, the extreme north-eastern part of San-tu ao, is entered through Bowring channel, which lies between the islet and flats off the eastern side of Chih-hsing-ch'ih tao and the
15 coast eastward ; Bowring channel is clear except for a rock, 7 feet (2^m1) high, lying about three-quarters of a mile eastward of the south-eastern point of Chih-hsing-ch'ih tao. Mount Alton, situated on the eastern side of the channel, is prominent.

Mud flats and shoal water extend for a considerable distance off
20 the greater part of the shores of San-tu nei-ao, but there are depths of over 5 fathoms (9^m1) in the middle part for about 3 miles within the entrance.

Northern part of San-tu ao.—Between Ling-shu chiao and Jonas point, situated about 4 miles north-westward, is a bight with mud
25 flats extending over one mile in places from its shores, and these completely fill Werner bay, situated at the head of the bight; Fu-ch'ih-ch'i (Kouang) is a village situated at the head of Werner bay. Grand range, situated on the northern side of Werner bay, is imposing, and Mount Pudsey Dawson, its highest part, is 2,514 feet (766^m3) high
30 and has three distinct summits ; about $3\frac{1}{2}$ miles north-eastward of the head of Werner bay this range connects with Slade range, and between them is a deep, cultivated valley.

Chart 2292.

Ch'ang-yao tao (Ma chui), separated from Jonas point by a channel
35 about $1\frac{1}{2}$ cables wide, is a barren island, and near its north-western end is a conical hill, 682 feet (207^m9) high ; a small islet, 24 feet (7^m3) high, lies close off the eastern point of the island, from which it is separated by a deep channel ; a bank, with depths of less than 3 fathoms (5^m5) over it, extends about $1\frac{1}{2}$ miles south-south-eastward
40 from this islet.

Ba-bu-san is an island, 573 feet (174^m7) high, separated from the north-western end of Ch'ang-yao tao by a deep channel about 2 cables wide ; a bank, with depths of less than 3 fathoms (5^m5) over it, extends nearly one mile northward from the island, but there is a
45 deep channel, leading to Yen-t'ien chiang (page 261) between the eastern edge of this bank and the flats extending from the coast eastward. A bank, with depths of less than 5 fathoms (9^m1) over it, extends about half a mile south-eastward from Ba-bu-san ; the channel between Ba-bu-san and the eastern end of San-tu tao is
50 clear and deep.

Charts 2292, 1988.

Ford point (Lat. $26^\circ 42' N.$, Long. $119^\circ 44' E.$) is situated about $2\frac{1}{2}$ miles north-westward of the south-western extremity of Ba-bu-san, and a bank, with depths of less than 3 fathoms (5^m5) over it, extends

Charts 1754, 2412, 1262, 1263.

Charts 2292, 1988.

about three-quarters of a mile southward and about 2 miles east-south-eastward from it to within about half a mile of Ba-bu-san. Crescent range forms the promontory of which Ford point is the south-eastern extremity, and its southern face is rocky and precipitous. 5

Chart 1988.

Yen-t'ien chiang, Weigall and Somerville channels.—Yen-t'ien chiang (Trinity channel) and Weigall channel are separated by a promontory formed by Pinnacle range, of which Thames point, 10 situated about 2 miles north-north-eastward of Ford point, is the southern extremity; Pinnacle range has a number of sharp peaks, and Mount Star, 1,870 feet (570^m0) high, situated about three-quarters of a mile northward of Thames point, is its highest summit.

Yen-t'ien chiang runs northward to Tree islet, situated about 3 15 miles north-north-eastward of Thames point, and then divides, the eastern branch being narrow and becoming gradually absorbed in the mud flats filling the bay north-eastward; the western branch narrows when about 2½ miles northward of Tree islet, and is almost blocked by mudbanks, but there is a channel, with depths of from 20 6 to 9 feet (1^m8 to 2^m7), nearly to the village of Yen-t'ien (Sieng-dieng), situated about 8½ miles above Tree islet.

Weigall channel leads between Thames point and Tay point, situated about 6 cables south-westward, into Chiao ch'i or Fu-an ho (Fuan river), which extends some 25 miles northward to Fu-an city. 25 The channel is deep, but northward of the point situated about one mile north-westward of Thames point the fairway becomes narrow, and the depths decrease to about 4 fathoms (7^m3). Between the inner end of Weigall channel and First point, situated on the western bank about 4 miles north-north-westward, the river flows through a 30 wide basin, known as Pai-shih chiang, between extensive drying flats. At Stone point, situated about one mile above First point, on the opposite bank, the river narrows to little more than a quarter of a mile. Mount Walsham, about 2,000 feet (609^m6) high, is situated about 2½ miles north-westward of First point. 35

Charts 2292, 1988.

Somerville channel is entered between the shoals which extend about three-quarters of a mile southward from Ford point (*Lat.* 26° 42' N., *Long.* 119° 44' E.) and the northern edge of San-tu t'an (bank), which extends from the northern side of San-tu tao; Elbow islet, 40 40 feet (12^m2) high, lies at the eastern end of San-tu t'an and nearly 1½ miles south-south-eastward of Ford point. Peak islet, 60 feet (18^m3) high, lies about 2 cables off the middle of the northern coast of San-tu tao. The channel approaches the coast of the mainland at Esk point, situated about 1½ miles westward of Ford point, and 45 thence runs fairly close along this coast to Bold point, nearly 2½ miles north-westward of Esk point. Beyond Bold point the channel passes southward of Loh-tsu island, and continues along the northern side of Heng hsü (Grieve island), which lies close northward of Spider island, and then opens out to a bay, which has only been partially 50 examined, but the entrance to which is almost blocked by an island named Pai-shih shan (Pa-sui-san).

Sheldrake flats extend eastward from Spider island and Heng hsü, leaving a channel about half a mile wide between them and the flat

Charts 1754, 2412, 1262, 1263.

Charts 2292, 1988.

which extends from the western side of San-tu tao; two creeks, with a joint entrance from this channel, lead to the villages of Tung-wan and Parquan, respectively, and between the two creeks is
 5 Kuei-lung (Flat island), 242 feet (73^m8) high. Heng hsü has a sharp peak, 1,040 feet (317^m0) high, on its south-western part; two islets lie off its eastern extremity, and southward of them are two islands known as Shih tao or Hecla islands.

Directions.—San-tu ao is easy of access in all weathers, but with
 10 strong north-easterly winds a heavy sea rolls in through the entrance, and with the out-going stream there are heavy tide rips.

Vessels bound for San-tu ao should pass midway between P'o lieh-tao and Chih-chu tao and then steer for the entrance. Channel rock may be passed on either side; the summit of Yen tao in line
 15 with Hail point, bearing 336°, leads eastward of it. Chi-chiao shan may be passed on either side, but it is reported that Aurora channel is more suitable for vessels with a large turning circle.

Chart 2292.

Vessels making for San-tu yang, when past Hail point, should
 20 steer a mid-channel course through Waterwitch channel, passing between Shih-men tao and the rocky ledge extending south-westward from Pillar rocks and thence north-eastward of Kaiser rock. After passing Kaiser rock course may be shaped as requisite for the anchorage, bearing in mind that the shoalest part of the channel, with a
 25 least depth of 4½ fathoms (8^m7), lies south-south-eastward of Hecla point (*Lat. 26° 38' N., Long. 119° 43' E.*). Vessels anchoring westward of Lay rocks must pass well clear southward of these rocks. The in-going tidal stream tends to keep a vessel in the middle of the channels, but when entering with the out-going tidal stream care is
 30 necessary when passing Castle point, Hail point, and between Shih-men tao and Pillar rocks, as that stream sets strongly on to the star-board bow.

Tidal streams.—The tidal streams turn at the times of high and low water on the shore; i.e. about 10 minutes after and one hour
 35 before the times of high and low water, respectively, at Min river (Admiralty Tide Tables Standard Port). In the entrance channel, they may attain a rate of from 4 to 7 knots, according to the age of the moon; they follow the directions of the channels, dividing where there are islands and running at a greater rate past their salient points.
 40 The stream entering the inlet divides southward of Chi-chiao shan, one branch passing through Aurora channel into the broad parts of the inlet, and the other following Waterwitch channel to San-tu yang.
Charts 2292, 1988.

Fishing nets.—**Caution.**—Numerous large nets are placed in San-tu
 45 tao and its approach; Waterwitch channel is at times almost completely blocked by fishing boats and nets. The nets are moored by heavy baskets of stones, and the net poles show in groups some feet above water; these should be avoided, as the mooring-ropes are very strong.

50 *Chart 1754.*

COAST.—**Shih chiao to the entrance to Ou chiang.**—**General remarks.**—From Shih chiao (page 251), the coast trends north-north-eastward for about 90 miles to the entrance to Ou chiang (kiang);

Charts 2412, 1262, 1263.

Chart 1754.

it is generally irregular, with numerous bays and inlets. There are many islands off this stretch of coast, several lying from 20 to 25 miles offshore.

Chart 1988.

5

Coast.—Anchorage.—Caution.—Between Shih chiao and Yü-te-li-ch'ih chiao (Goodridge point), situated about $4\frac{1}{2}$ miles northward, the coast forms a bay which has been only partially examined. Pi-teng tao (Bittern island) lies near the head of the bay; there is a small sandy cove westward of the northern part of the island, and a small vessel with local knowledge can obtain sheltered anchorage in either monsoon, in a depth of $3\frac{1}{2}$ fathoms (6^m4), between the cove and the island. As dangers may exist in the bay, great caution must be exercised. Some islets lie off Shih chiao and Yü-te-li-ch'ih chiao.

Fei-lung tao (Fielon island) lies close off a point situated about $4\frac{1}{2}$ miles northward of Yü-te-li-ch'ih chiao, and between this island and Yü-te-li-ch'ih chiao are several islets and rocks, the positions of which are best seen on the chart.

Chart 1754.

Outlying islands.—Pei-shuang lieh-tao (Piseang or Tsi-sing islands) are a group of islets and rocks, the southernmost of which, Bare rock (*Lat.* $26^{\circ} 38' N.$, *Long.* $120^{\circ} 19' E.$), lies about 10 miles eastward of Shih chiao; the westernmost rock lies nearly 3 miles north-westward of Bare rock. Nan-shuang or Country island, the south-eastern islet, is about 400 feet (121^m9) high. A reef, on which is a rock drying 6 feet (1^m8), extends about half a mile north-eastward from Tung-shuang, the eastern islet, and is marked by breakers. Pei-shuang or Town island, the northern and largest island of the group, lies about 3 miles northward of Nan-shuang; a small cove on its south-western side affords shelter to small vessels. There are fishing stakes north-westward of Pei-shuang.

Charts 1988, 1754.

Fu-ning wan.—**Anchorage.**—Fu-ning wan (Funing bay) is entered between Fei-lung tao and a point situated about 7 miles north-north-eastward; it has been only partially examined, but it appears to be very shoal, and there are several islets and rocks in it. Hsia-p'u (Funing-fu) is a town situated at the head of the bay. A group of islets, named Feng-huo lieh-tao lies in the northern part of the bay, and the south-eastern and largest of these (Fong-ho) is situated about one mile southward of the northern entrance point. Sansha village, a large local fishing centre with a population of over 1,000 in 1931, is situated near the northern entrance point.

Good anchorage has been obtained off Sansha village, in a depth of $4\frac{1}{2}$ fathoms (8^m2), with the northern entrance point of the bay bearing 043° , distant $3\frac{1}{2}$ cables. In 1931 H.M.S. *Sepoy*, after passing half a mile northward of the largest island of Feng-huo lieh-tao on a westerly course, approached the anchorage off Sansha village steering 003° , with Sansha islet, lying close offshore and having a ruined castle on its summit, just on the port bow.

Chart 1754.

50

Fu-yao shan and adjacent islands.—**Anchorage.**—Fu-yao shan (Fu-yan) is the easternmost and largest of a group of islands extending for a distance of about 10 miles eastward from the northern entrance point of Fu-ning wan. Feng-huo shan or Angle island, the western-

Charts 2412, 1262, 1263.

Chart 1754.

most of the group, is separated from the mainland by Little pass, a narrow passage, somewhat obstructed by rocks, with a least depth of 3 fathoms (5^m5) in the fairway. There is a good typhoon anchorage, for one vessel, in a depth of 9 fathoms (16^m5), in the southern part of Little pass.

Ch'u-pi tao (island), situated eastward of Feng-huo shan, is separated from that island by Ch'u-pi men (pass), about one mile wide, but in the southern part the navigable passage is reduced to half that width by a group of low rocks lying about half a mile south-eastward of Feng-huo shan. Sugarloaf islet lies close off the southern side of Ch'u-pi tao (*Lat.* 26° 56' N., *Long.* 120° 18' E.).

Fu-yao shan is separated from the eastern end of Ch'u-pi tao by Fu-yao men or Fu-yan pass, a narrow passage with depths of from 7 to 9 fathoms (12^m8 to 16^m5); heavy squalls from the high land and strong eddies render this passage less desirable than the others, and it is also much obstructed by fishing stakes. Large numbers of fishing stakes extend northward and north-westward from the north coast of Fu-yao shan.

In 1906, H.M.S. *Alacrity* obtained soundings of 7 fathoms (12^m8) about 3 miles south-eastward of Fu-yao shan. Depths of 3 fathoms (5^m5) were reported, in 1908, northward of Ch'u-pi tao and between Fu-yao shan and the mainland, where the chart shows depths of about 5 fathoms (9^m1). In 1931, H.M.S. *Sepoy* reported less depths than charted about 2 miles northward of Fu-yao shan, over an area with a radius of about one mile.

There is reported to be good anchorage, in a depth of 6 fathoms (11^m0), sand, about one mile westward of Fu-yao shan; H.M.S. *Sepoy* obtained good anchorage, in a depth of 6 fathoms (11^m0), with the eastern point of Fu-yao shan bearing 180°, distant one mile.

Outlying islands and dangers.—Anchorage.—The westernmost island of Ying-ko-ku lieh-tao (Incog islands), a group of islands and rocks, is 100 feet (30^m5) high and lies about 5 miles north-eastward of the eastern point of Fu-yao shan; the eastern and largest of the group is 150 feet (45^m7) high; an islet, 120 feet (36^m6) high, with rocks nearby, lies close southward of the eastern island. See view facing page 270. In the north-east monsoon, anchorage can be obtained, by vessels with local knowledge, in a depth of 6 fathoms (11^m0), mud, about 2 cables off the south-western side of the western island; two white masts in line, bearing 058°, lead towards this anchorage. There is also anchorage north-westward of this island, in a depth of 7 fathoms (12^m8); this anchorage is defined by the intersection of two pairs of marks, surmounted by shapes, situated eastward and westward of the lighthouse (see page 265), respectively.

Solitary rock, situated about 3½ miles north-westward of the western island of Ying-ko-ku lieh-tao, is 200 feet (61^m0) high, and a reef extends about 2 cables eastward from it; there is a safe channel between this rock and Ying-ko-ku lieh-tao.

Dangerous rock, situated about 7½ miles south-eastward of the largest island of Ying-ko-ku lieh-tao, is 8 feet (2^m4) high.

Strawstack (*Lat.* 26° 56' N., *Long.* 120° 41' E.), situated about 9 miles north-eastward of Dangerous rock, is a rocky islet about 300 feet (91^m4) high; a smaller islet lies close north-westward of it.

A rock, awash, was reported by the s.s. *Waratah*, prior to 1863, to

Charts 2412, 1262, 1263.

Chart 1754.

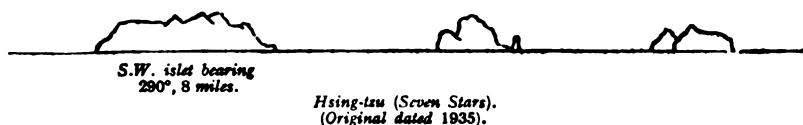
lie about $4\frac{1}{2}$ miles westward of Strawstack, but its position is doubtful. In 1903, H.M.S. *Waterwitch* passed within half a mile of its assigned position, and, although a heavy easterly swell was running, no indications of the rock were seen. 5

A pinnacle rock of unknown depth was reported, in 1953, to lie about $2\frac{1}{2}$ miles south-westward of Strawstack.

T'ai-shan lieh-tao (Tai islands) consist of two islands and a number of rocks; Chung-t'ai, the south-eastern island, lies about $2\frac{1}{2}$ miles north-north-eastward of Strawstack and has a table top summit about 400 feet (121^m9) high. See view facing page 270. Mushroom rock, 260 feet (79^m2) high, lies close off the north-eastern point of Pei-t'ai, the northern island; an islet, 103 feet (31^m4) high, lies about one mile westward of the southern point of this island. A reef awash, with a rock 30 feet (9^m1) high on it, lies about one mile westward of the northern end of Pei-t'ai, and another reef awash lies about one mile further westward. A reef, awash, lies about $4\frac{1}{2}$ miles north-westward of Pei-t'ai. 10

Vessels passing between Ying-ko-ku lieh-tao and T'ai-shan lieh-tao should keep well towards the western side of this passage, as the ground in the vicinity of the latter group has not been surveyed. 15

Hsing-tzu (Seven Stars) is a group of islets and rocks; the south-western and largest islet, which lies about $6\frac{1}{2}$ miles east-north-eastward of Mushroom rock, is about 200 feet (61^m0) high and is split in two. A rock, awash, lies about 3 cables westward of this islet. A rugged islet, 70 feet (21^m3) high, lies about one mile north-eastward of the south-western islet, and about the same distance further north-eastward are three low, flat rocks, the easternmost of which dries; there are other rocks around. See view below. 20



Cleft rock, 50 feet (15^m2) high, lies about 3 miles north-north-westward of the south-western islet of Hsing-tzu. 25

Light.—A light is exhibited, at an elevation of 136 feet (41^m4), from a white circular tower, 61 feet (18^m6) in height, situated on the western extremity of the western island of Ying-ko-ku lieh-tao; see view facing page 270. 30

Coast.—The coast between Feng-huo shan and Mortice bluff, situated about $13\frac{1}{2}$ miles north-eastward, is indented by Li-shan ao (Ngasiang bay) and Ch'ing-ch'uan wan (Tchinkoen bay), but neither of them has been thoroughly examined. A rock, which dries 5 feet (1^m5), lies about 4 cables southward of the southern entrance point of Li-shan ao, and a rock, awash, is charted about 2 cables north-eastward of the same point. 35

Mortice bluff is an island almost connected to the mainland, as there is only a narrow boat channel on either side of an intervening islet. 40

Chart 1754, and plan of Nam-kwan harbour. 45

Nan-kuan chiang.—Islets and dangers.—**Anchorage.**—Nan-kuan chiang (Nam-kwan harbour) is entered between Fu-chien t'ou

Charts 2412, 1262, 1263.

Chart 1754, plan of Nam-kwan harbour.

or Fukien tow (Fuhkien head), situated about 3 miles north-north-eastward of Mortice bluff, and Nan-kuan (Nam-kwan) point, about three-quarters of a mile further northward. The harbour is surrounded by high hills and extends in a general north-westerly direction for about 13 miles north-westward of Fu-chien t'ou, where it appears to expand into a wide basin, known as Nan-k'ai chiang (Gordon bay), which has not been surveyed. The harbour affords shelter in a typhoon.

10 Town point is situated on the northern side of the entrance and about $1\frac{1}{4}$ miles west-south-westward of Nan-kuan point, and there is a village, named Sha-ch'eng, at the head of Town bay, on its northern side. Bate islet lies close off Town point, and a rocky reef, which dries, extends about 2 cables north-westward from the islet.

15 The fairway of the entrance channel is deep, but the depths are very irregular; in 1927, a depth of 5 fathoms (9^m1) was reported about $5\frac{1}{2}$ cables southward of Bate islet, and in 1908 a 7-fathom (12^m8) patch was reported about 2 cables south-westward of that islet.

Tree islet is situated in the middle of the harbour and nearly $1\frac{3}{4}$ miles north-westward of Bate islet; the deep channel passes westward of this islet and westward of a rock, with a depth of $4\frac{1}{2}$ fathoms (8^m2) over it, reported, in 1908, to exist about 7 cables north-westward of Bate islet; a mudbank extends from the eastern side of the harbour in this vicinity.

25 Kin-sho (Lat. $27^\circ 14' N.$, Long. $120^\circ 23' E.$) is an islet lying nearly $2\frac{1}{2}$ miles northward of Tree islet; a rock, which dries, lies close off the south-western side of Kin-sho, and a reef, awash, lies about $1\frac{1}{2}$ cables off its eastern side. An island (chart 1754), almost connected to the northern shore, lies about $4\frac{3}{4}$ miles above Kin-sho, and a rock, awash, with a rock, above water, one cable north-westward, lies about 2 cables eastward of this island.

There is anchorage north-westward of Bate islet, in a depth of 14 fathoms (25^m6); small vessels can anchor from 2 to 6 cables south-eastward of Tree islet, in depths of from $3\frac{1}{4}$ to 5 fathoms (5^m9 to 9^m1), soft mud. In 1936 H.M.S. *Sandwich* anchored with Nan-kuan point bearing 020° , distant 5 cables; owing to the difficulty in weighing the anchor the following day, it was thought that the bottom was rock. There are many fishing nets off the entrance to the harbour, and the harbour itself is greatly obstructed by nets and bamboo moorings laid for sampans. Vessels should not attempt to proceed above Tree islet without local knowledge.

Chart 1754.

Yen-p'u wan.—Anchorage.—Yen-p'u wan (Nam-kwan bay) is entered between Nan-kuan point and Nan-kuan shan (Chin-kwan island), which lies with its northern extremity about 2 miles eastward of this point. The depths shoal very abruptly at the entrance and the bay is very shallow. Nan-kuan (Nam-kwan), a walled town, is situated on the northern shore. Niu-kan shan (Crag peak), situated about $4\frac{1}{2}$ miles northward of Nan-kuan point, overlooks the bay.

60 A reef extends about one cable from the southern extremity of Nan-kuan shan, and also nearly $1\frac{1}{2}$ cables from the islet lying close off its south-western point. There is anchorage, in depths of from 7 to 9 fathoms (12^m8 to 16^m5), off the south-western side of Nan-kuan shan, northward of the second islet from its southern end.

Charts 2412, 1262, 1263.

Chart 1754.

Pei-kuan chiang.—**Buoy.**—Pei-kuan chiang or Pehkwan kiang (Pi-kwan harbour) lies between Nan-kuan shan and Lo-ying shan (Ping-fong island), situated about $1\frac{1}{2}$ miles eastward, the mainland forming its northern side. The harbour affords good shelter in the north-east monsoon to vessels having local knowledge and with a draught of less than 15 feet (4^m6); it is also available in a typhoon.

A shoal, with a depth of 3 fathoms (5^m5) over it, lies in the entrance to Pei-kuan chiang and about three-quarters of a mile south-westward of the southern point of Lo-ying shan (*Lat.* 27° 09' N., *Long.* 120° 31' E.). A red conical buoy is moored about half a mile eastward of the southern extremity of Nan-kuan shan. A sunken rock lies close off the south-western point of Lo-ying shan, and this point should be given a berth of a quarter of a mile.

Coast.—**Islands and dangers.**—A rock above water, with a sunken rock close westward of it, lies about one mile eastward of the southern point of Lo-ying shan; an islet, with a sunken rock off its eastern end, lies close off the eastern point of the same island. Vessels should pass eastward of these dangers. Pi pass, situated between the northern end of Lo-ying shan and the mainland, is obstructed by several rocks and islets.

Kwan t'ou (head) is situated about $5\frac{1}{2}$ miles north-eastward of Nan-kuan point; Toe point, situated about 3 miles further north-eastward is the eastern extremity of an island, named Ts'ao hsü, which is about 318 feet (96^m9) high. Nob point lies about $3\frac{1}{2}$ miles northward of Toe point. Hao-ting shan (Pi-kwan peak), situated about 6 miles west-north-westward of Nob point, is a remarkable, sharp, conical hill.

Ta-yü or Tanue wan (Tanue bay), situated between Nob point and Ta-yü chiao (Tanue point), lying about 6 miles north-eastward, has general depths of less than 2 fathoms (3^m7); Kuan shan (Keun island) lies in the middle of the entrance, and Kao-kuan shan (Gap islet), a low rock, lies about $1\frac{1}{2}$ miles southward of Ta-yü chiao. A rock, awash, lies about a quarter of a mile southward of Ta-yü chiao, and some rocks, above water, lie about the same distance south-westward of this point.

Pai-mou chiao (Farmer rock), which dries, lies about 4 miles north-eastward of Ta-yü chiao.

Pingyang tsui (point) is situated about 6 miles northward of Ta-yü chiao; an islet, named Chui-shih shan, lies close inshore about midway between them.

From Pingyang tsui (*Lat.* 27° 28' N., *Long.* 120° 40' E.), the coast trends north-westward for about 9 miles to the entrance to Ao chiang (kiang). P'i-p'a shan (Fiddle island) lies close inshore about 4 miles north-westward of Pingyang tsui, with foul ground about one mile north-eastward of it. Ch'ang-yao shan, 105 feet (32^m0) high, situated about 4 miles northward of Ping-yang tsui, is the southern of five small islets lying in the approach to Ao chiang. Ssu hsü, 121 feet (36^m9) lies about 2 miles north-north-eastward of Ch'ang-yao shan, and San hsü, 72 feet (21^m9) high, lies about 3 miles north-eastward of the same island. Erh hsü and T'ou hsü are situated, respectively, about half a mile and $1\frac{1}{2}$ miles north-eastward of San hsü. The area between these islets and the entrance to Ao chiang is known as Ao-chiang k'ou. Ching-fang t'ou (Kinvang head) is

Chart 1754.

situated about $5\frac{1}{2}$ miles north-eastward of the entrance to Ao Chiang; an islet, named Yang hsü, lies close inshore about midway between.

- 5 The town of Ku-ao-t'ou, with a population of 15,000 to 20,000, lies on the northern bank of Ao Chiang a short distance inside the entrance. The port of Ku-ao-t'ou lies off the town; there is anchorage for vessels drawing up to 10 feet (3^m0). Limited quantities of fuel are available. There are telegraph and long distance telephone
10 services in the town.

Chart 1763.

- Fei-yün Chiang (Kiang) discharges about 4 miles northward of Ching-fang t'ou; there is a depth of 5 feet (1^m5) on the bar. The town of Jui-an (Jui-an-hsien), with a population of about 20,000, lies
15 on the northern bank of the river about 5 miles above the entrance. There is anchorage off the town for vessels drawing 12 feet (3^m7). A wharf is available.

- From the entrance to Fei-yün Chiang, the coast trends north-eastward for about 16 miles to the southern entrance point to Ou Chiang,
20 and is fronted by drying flats from 2 to 4 miles wide.

- The four western islands (Tsang islands) of Tapeh lieh-tao (Tae-pi islands), described on page 269, lie off the mouth of Fei-yün Chiang. Ch'ih-t'ou shan, the southern and largest of these islands, is 446 feet (135^m9) high, and lies about 9 miles eastward of Ching-fang t'ou
25 (*Lat. $27^{\circ} 40' N.$, Long. $120^{\circ} 39' E.$*); it is on the northern side of the passage over the bar. Six small islets lie between these islands and the coast. Cheng hsü, the southern of the two southern islets, lies about $1\frac{1}{2}$ miles north-westward of Ch'ih-t'ou shan. Ch'ang-pa shan lies about $1\frac{1}{2}$ miles north-westward of Cheng hsü. Ting shan lies
30 about one mile north-westward of Ch'ang-pa shan. Hsiao-ting shan lies about $1\frac{1}{2}$ miles north-north-eastward of Ch'ang-pa shan, with Shang-t'ao-chih close eastward of it. There is a dangerous rock about midway between Ting shan and Hsiao-ting shan.

Chart 1754.

- 35 **Off-lying islands and dangers.—Anchorages.**—Lu-ying or Castelled rock, situated about 18 miles eastward of Ta-yü chiao, appears as two islets.

- Nan-chi shan (Nam-ki), 740 feet (225^m5) high, lying about 20 miles eastward of Pingyang tsui, is the largest of a group of islands,
40 called Nan-chi-shan lieh-tao or Nankishan lieh-tao, for the formation of which the chart should be consulted. Ta-lei shan is the northern islet of the group. Chu hsü is the largest of the islets on the eastern side of Nan-chi shan, and Chiang-yao shan the largest of those on the southern side. Hsia-ma-an is an islet situated about $3\frac{1}{2}$ miles south-
45 westward of Nan-shi shan, on the south-western edge of a considerable area of foul ground. Nan-chi Chiang or Nanki Kiang (Port Nam-ki) is situated on the south-eastern side of Nan-chi shan, but a swell rolls in during the north-east monsoon and also with south-easterly winds. A bay on the northern side of the western point of
50 Nan-chi shan affords anchorage, with smooth water, for vessels with local knowledge, and it is frequented by junks.

In February, 1939, fishing stakes were observed extending about 5 miles eastward from the eastern side of Nan-chi-shan lieh-tao.

Shan-ma-an (Turret islet) lies about $4\frac{1}{2}$ miles westward of the

Charts 2412, 1262, 1263.

Chart 1754.

western point of Nan-chi shan ; reefs lie about a quarter of a mile northward and about three-quarters of a mile westward of this islet, which is small and conical.

Charts 1763, 1754.

Pei-chi (Pi-ki) shan, 351 feet (107^m0) high, is the largest and north-western of a group of three islands called Pei-chi-shan lieh-tao or Pehkishan lieh-tao, and lies about 10 miles north-eastward of Nan-chi shan (*Lat.* 27° 28' N., *Long.* 121° 04' E.). The central island is called Pei-k'u-tang, and the south-eastern Nan-k'u-tang.

The island of Ta-ming-fu lies nearly one mile westward of Pei-chi shan ; the channel between is encumbered with rocks. Two islets, surrounded by rocks, lie about 2 miles westward of Ta-ming-fu.

Chart 1763.

Tung-kua hsü (yu), also known as Shroud island, lies about 7 miles westward of Pei-chi shan, and terminates westward in a noticeable bluff. Foul ground, on which are three small islets, extends fully half a mile westward and north-westward from the island ; the northern islet is named San chiao, and the southern Hsiao-tung-kua. A rock above water, with a rock, awash, close southward of it, lies close off the southern point of the island, and Chuen-tiao, a rock, with a depth of 16 feet (4^m9) over it, lies about half a mile southward of this point. Nan-chih, an islet 47 feet (14^m3) high, with foul ground extending about 2 cables northward from it, lies about 2½ miles north-north-westward of Tung-kua hsü.

Pei-lung shan, an island lying about 4 miles west-north-westward of Tung-kua hsü, is 645 feet (196^m6) high ; it is bordered by rocks in places, and Lo-ssu hsü (yu), a rock 21 feet (6^m4) high, lies close off its northern point. Lung-chu, an islet with rocks extending about one cable from its northern side, lies nearly 4 cables off the western side of Pei-lung shan, to which it is joined by a shallow bank. Six more islets lie within a distance of 2 miles westward and south-westward of Lung-chu ; these include Tatsung (Tsung) shan, Hsiao-tung shan, P'an-tsiao, Ta-chih shan, and Hsiao-chih shan. Anchorage can be obtained, by vessels with local knowledge, between these islets and the western side of Pei-lung shan, in a depth of about 7 fathoms (12^m8).

Tapeh lieh-tao (Tae-pi islands) consists of two groups separated by a channel about 3 miles wide. Li-chi shan (*Lat.* 27° 41' N., *Long.* 120° 55' E.), the south-eastern of the eastern group, lies about 2½ miles west-north-westward of the north-western point of Pei-lung shan ; T'ung-p'an shan, the north-western island of the group, lies nearly 2 miles north-westward of Li-chi shan, and is 190 feet (57^m9) high ; Ch'ang-tai shan, 265 feet (80^m8) high, lies about 4 cables south-eastward of T'ung-p'an shan, with Shan-chi hsü (yu), an islet 78 feet (23^m8) high, between ; Heng-liang shan lies between Ch'ang-tai shan and Li-chi shan, and has an islet close off its north-western side. Rocks, some of which dry, extend about 4 cables from the eastern side of Ch'ang-tai shan, and Chin-chi hsü (yu), an islet 77 feet (23^m5) high, lies about 6 cables north-north-eastward of the north-eastern point of this island. Small vessels can obtain sheltered anchorage in the north-east monsoon, with smooth water, on the south-western side of these islands, in depths of from 3½ to 4 fathoms (6^m4 to 7^m3).

Charts 2412, 1262, 1263.

Chart 1763.

The western group of Tapeh lieh-tao (Tsang islands) includes four principal islands and a few islets and rocks. Shan-kuan shan, the northern island, is 407 feet (124^m0) high, and lies about 3½ miles west-south-westward of T'ung-p'an shan. Feng-huang shan, 597 feet (182^m0) high, lies about half a mile south-eastward of Shan-kuan shan, with Hsia-kuan shan, 249 feet (75^m9) high, close south-eastward of it. Ch'ih-t'ou shan, the southern island, was described on page 268.

- 10 **Light.**—A light is exhibited, at an elevation of 239 feet (72^m8), from a white circular tower, 26 feet (7^m9) in height, on the western extremity of Tung-kua hsü.

OU CHIANG AND APPROACHES.—The approaches to Ou chiang (kiang) are obstructed by great numbers of islands, rocks, and shoals. Many of the islands are of considerable size.

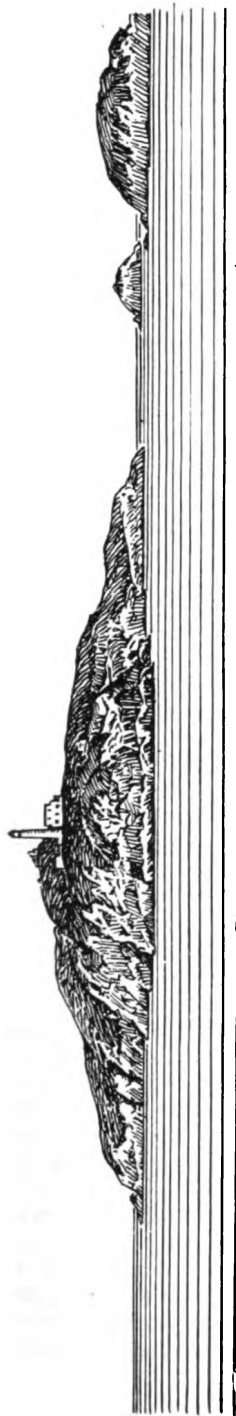
- T'se islands.**—T'se or Tseigh islands, the south-eastern group of the larger islands lying off the mouth of Ou chiang (page 275), consists of four islands, the south-western and largest of which, named Nan-t'se shan, lies about 8 miles north-north-eastward of Tung-kua hsü, and is 590 feet (179^m8) high. Pei-t'se shan, 500 feet (152^m4) high, and Hsi-t'se shan, the two northern islands, are connected at low water and are separated from Nan-t'se shan and Tung-t'se shan, the two southern islands, by Tung-nan men, a narrow channel with depths of from 5½ to 10 fathoms (10^m1 to 18^m3) in the fairway; at the western end of this channel, however, the depths decrease rapidly to 3½ fathoms (6^m4). Tung-t'se shan is 565 feet (171^m6) high, and foul ground, on which are several islets and rocks, extends nearly half a mile from its south-eastern side.

- Islets and dangers between the Pei-chi-shan lieh-tao and T'se islands.**—Pen-chi hsü (yu) is an islet lying about 1¾ miles northward of the western extremity of Pei-chi shan, and about 4 cables further northward is a smaller islet named Niu-pi shan; Pei-hsing, a rock which dries 18 feet (5^m5), lies about 2 cables northward of Niu-pi shan, and is the northernmost danger of the group. Hsi-hsing, a rock which dries 10 feet (3^m0), lies nearly 1½ miles westward of Pen-chi hsü, and Tung-hsing, which dries 18 feet (5^m5), lies about 4 cables eastward of this islet.

- Fu-ting lies about 4 miles southward of the southern point of Nan-t'se shan and is 7 feet (2^m1) high. Kua-kua hsü (yu), lying nearly one mile east-north-eastward of Fu-ting (*Lat.* 27° 41' N., *Long.* 121° 07' E.), is divided into two parts, the northern and highest of which is 185 feet (56^m4) high; foul ground extends nearly 2 cables southward from this islet. Kuei chiao, a reef which dries 2 feet (0^m6) lies nearly 1½ miles east-north-eastward of Kua-kua hsü. Nan-pai hsü (yu) is a low islet lying about 1¾ miles north-eastward of Kua-kua hsü, and Pei-pai hsü (yu) lies nearly half a mile eastward of Nan-pai hsü; Sheng chiao, a rock with a depth of 6 feet (1^m8) over it, lies about half a mile north-eastward of Nan-pai hsü.

- Hsia-wu chiao, a rock 11 feet (3^m4) high, lies about 1½ miles northward of Pei-pai hsü. Mu tao, Fu tao, and Tzu tao, lying about one mile north-westward of Hsia-wu chiao, comprise a group of three islets, with several rocks around; westward of this group are Mo tao and Ke tao, two islets close together and separated from the first

Charts 1754, 1759, 2412, 1262, 1263.



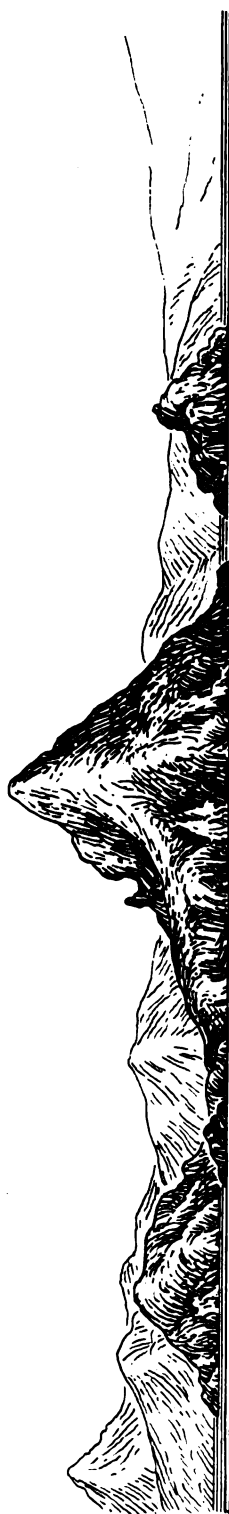
Ying-ko-ku lieh-tao (Incog islands) from westward.

Starstack, bearing 315°
distant about 5 miles.

T'ai-shan lieh-tao.

T'ai-shan lieh-tao (Tai islands) from south-eastward.
(Original dated 1844).

Part of Hsing-tzu
(Seven Stars).

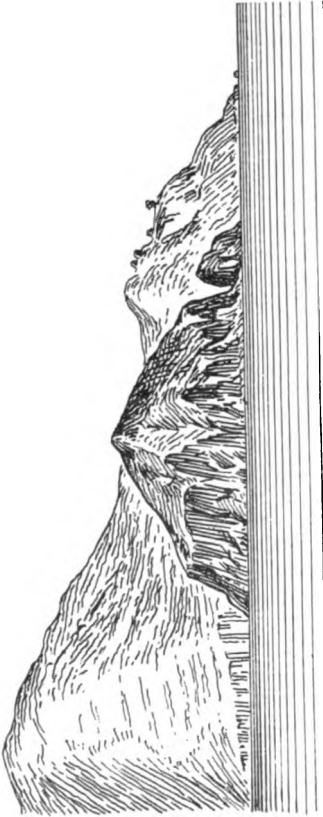


I hsiü (I-yu) shan. Yuan hsiü (yu).

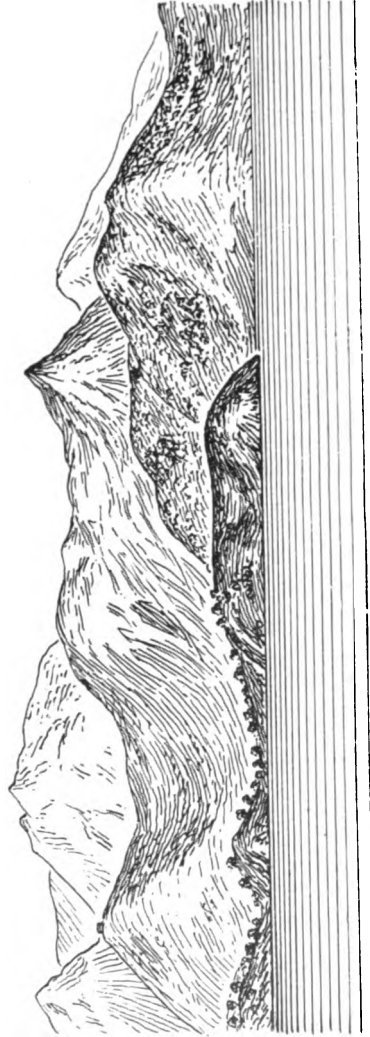
Hu-tou hsiü, bearing 287° , 3 miles.

Two views of Hu-tou hsiü (yu).
(Originals dated 1844).

Chih-tou hsiü (yu).



Ch'ing ling hsü (yu), bearing 180°.
Ou chiang (kiang): Pei shui-tao (North passage).
(Original dated 1878).



Cone peak, bearing 238°.
Lung-kan Fou.
Ou chiang.
(Original dated 1878).

Chart 1763.

group by a channel about a quarter of a mile wide, with depths of from 5 to 9 fathoms (9^m1 to 16^m5). The channel between Mo tao and the foul ground extending south-eastward from Tung-t'se shan is about 3 cables wide, with depths of about 5 fathoms (9^m1). 5

Hu-fen chiao, situated about $1\frac{1}{2}$ miles south-westward of Ke tao, is a reef which dries 12 feet (3^m7). Hu hsü (yu) lies about 6 cables westward of Hu-fen chiao and is 28 feet (8^m5) high. Wang-tiao chiao, a reef awash, lies about one mile northward of Hu hsü and about half a mile southward of the southern point of Nan-t'se shan; 10 Niu chiao, with a depth of 2 fathoms (3^m7) over it, lies nearly $1\frac{1}{2}$ miles west-north-westward of Hu hsü.

Hei-niu wan.—**Islands and dangers.**—**Anchorage.**—Hei-niu wan, also known as Bullock harbour, is situated on the southern side of Tung-t'ou shan, which is the largest island of the group situated 15 south-eastward of the mouth of Ou chiang, and lies with its western point, Sha-ou pi, about $3\frac{1}{2}$ miles north-westward of Pei-t'se shan. Yen-tun shan, the summit of Tung-t'ou shan, is 740 feet (225^m5) high; the island is cliffy on its eastern side; there are several bays along its coasts, but they are mostly filled with drying flats. The 20 harbour is bounded eastward by T'se islands and Pan-mien shan, an island, 470 feet (143^m3) high, situated about half a mile northward; northward by the western part of the southern coast of Tung-t'ou shan; and westward by a chain of three islands extending about $2\frac{1}{2}$ miles southward from the western point of Tung-t'ou shan. 25 The harbour affords good anchorage in depths of from 3 to 7 fathoms (5^m5 to 12^m8), but it is open to southerly and south-westerly winds, which bring in a heavy swell; it affords shelter in a typhoon.

The harbour is entered from southward between T'se islands and Ta-chü shan, 780 feet (237^m7) high, the southernmost of the islands 30 forming the western side of the harbour, and a depth of not more than $3\frac{1}{2}$ fathoms (6^m4) can be carried through the deepest parts of this channel. Ta-chü shan is cliffy on its southern and south-eastern sides; a 17-foot (5^m2) patch lies about half a mile south-eastward of its south-eastern point. A spit, with depths of less than 3 fathoms 35 (5^m5) over it, extends about one mile westward from the western side of Pei-t'se shan (*Lat. $27^{\circ} 47' N.$, Long. $121^{\circ} 08' E.$*).

Tung-pei men, the eastern passage into Hei-niu wan, lies between T'se islands and the southern side of Pan-mien shan, and has depths of more than 20 fathoms (36^m6) over a width of fully 4 cables; 40 the deepest part of the harbour, with depths of over 5 fathoms (9^m1), lies westward of this passage. A flat, which dries, extends from the north-western side of Pan-mien shan, leaving only a narrow shoal passage, known as Pai-lu men, between it and the southern coast of Tung-t'ou shan. 45

Chung-chu shan and Hsiao-chu shan are the two islands northward of Ta-chü shan and on the western side of Hei-niu wan; they are 185 and 205 feet (56^m4 and 62^m5) high, respectively. There is a deep passage, named Hsi-nan men, between Ta-chü shan and Chung-chu shan, and another, named Hsi-pei men, between Hsiao-chu shan 50 and the western extremity of Tung-t'ou shan; these passages cannot be approached from the westward, however, without crossing a bank with depths of less than 3 fathoms (5^m5) over it. Sheltered anchorage can be obtained north-westward of Hsiao-chu shan, and

Chart 1763.

also westward of Niu-shih chiao, an islet of heaped up stones, 18 feet (5^m5) high, lying close off the western point of Tung-t'ou shan.

Hei-niu wan is greatly obstructed by fishing stakes and nets.

- 5 **Islands and dangers eastward of Tung-t'ou shan.**—Ta-chu shan (Ta-chih yu) lies about 1½ miles eastward of the south-eastern extremity of Tung-t'ou shan, and is 230 feet (70^m1) high. Foul ground, on which are some islets, including Hsiao-chu shan (Hsiao-chih yu) and Wai-chih hsü (yu) extends about half a mile southward
10 from the south-western point of the island. Pa chiao, with a depth of 5 fathoms (9^m1) over it, lies a little further southward. Chih chiao, an islet 54 feet (16^m5) high, lies on a partly drying reef about 3 cables north-westward of the western point of Ta-chu shan.

- Several reefs lie within a distance of one mile off the northern half
15 of the eastern coast of Tung-t'ou shan; Ao chiao, the northernmost of these, with a depth of one fathom (1^m8) over it, lies about 3½ cables offshore and about one mile south-south-eastward of Kuan-chao t'ou, the north-eastern extremity of Tung-t'ou shan. Ching chiao lies about 3½ cables southward of Ao chiao, and is awash. Sha chiao and
20 Man chiao, with depths of 3 and 4 fathoms (5^m5 and 7^m3) over them, respectively, and Wu chiao, above water, lie between Ching chiao and Chih chiao. There are a number of other rocks and islets close inshore off the eastern side of Tung-t'ou shan; these include Han-chia chiao, Chia-lao chiao, Hsia chiao, Ku hsü (yu), and Liang-jen
25 hsü (yu).

- Hu-tou hsü (yu) lies about 1½ miles east-north-eastward of the northern point of Ta-chu shan, and is 325 feet (99^m1) high; these two islands should not be confused. An islet lies close northward of the western extremity of Hu-tou hsü (*Lat.* 27° 50' N., *Long.* 121° 14' E.),
30 and is connected to it by a reef; another islet lies about 1½ cables westward of this point. Yuan hsü (yu), situated about half a mile westward of the western point of Hu-tou hsü, is the southernmost of a group of islets and rocks lying together on a reef; Chih-tou hsü (yu) is the northern islet of this group. *See* view facing page 270.

- 35 **Tung-t'ou hsia.**—**Islands and dangers.**—**Anchorage.**—Tung-t'ou hsia (strait) or Tungtow strait is bounded on the south-eastern side by Tung-t'ou shan and Ta-san-p'an (Ta-san-pang) shan or Little Sanpwan island, and north-westward by I-hsü (I-yu) shan and Chuang-yüan-ao (Chuan-yuan-ou) shan or Great Sanpwan island.
40 There are depths of from 2½ to 3 fathoms (4^m6 to 5^m5) in the south-western entrance of the strait, but further in, about half a mile northward of the western extremity of Tung-t'ou shan, there is a bar with a depth of only 11 feet (3^m3); within this bar the depths in the fairway increase gradually to 3 fathoms (5^m5) and more; the north-
45 eastern entrance is deep. Tung-t'ou hsia is only available for vessels of shallow draught, and local knowledge is necessary.

- I-hsü shan lies with Mao tsui, its south-western point, about 3½ miles west-north-westward of the western point of Tung-t'ou shan; Mao tsui has a hill on it, 125 feet (38^m1) high, and is the southern
50 extremity of a peninsula joined to the main part of I-hsü shan by a low isthmus. The highest peak on the island is situated about 2 miles north-eastward of Mao tsui, and is 1,075 feet (327^m7) high.

Hsiao-i hsü (yu), the middle and largest of a group of three islets, lies nearly one mile westward of Mao tsui and is 100 feet (30^m5) high;

Chart 1763.

I chiao, the eastern islet of this group, is 35 feet (10^m7) high. Lung hsü, a reef which dries 7 feet (2^m1), lies nearly 3 miles west-south-westward of Hsiao-i hsü, and about half a mile south-westward of Lung hsü is Lung-mu chiao, which dries 18 feet (5^m5); both these dangers lie on the coastal bank which extends from the mainland southward of the mouth of Ou chiang.

The south-western extremity of Chuang-yüan-ao shan lies about 7 cables eastward of the eastern point of I-hsü shan, the space between being almost entirely filled by a flat which dries, on which are two islets, separated from each other by Chien men; the western islet is named Chien-men shan. Between the eastern islet and Chuang-yüan-ao shan, there is a narrow channel, named Sheng men, which is available for boats. The south-western end of Chuang-yüan-ao shan is 300 feet (91^m4) high; thence the land rises to the summit of the island, 762 feet (232^m3) high, where there are two mounds close together, which are prominent when seen from eastward or westward. Wen-tzu t'ou (*Lat.* 27° 55' N., *Long.* 121° 09' E.) is the outer end of a long, narrow tongue of land forming the north-eastern extremity of the island.

Chin-li hsü (Hua-chien shan), also known as Middle island, lies close off the south-eastern point of Chuang-yüan-ao shan, on the drying flat extending from the southern coast of that island. The eastern side of Chin-li hsü is a steep cliff, rising close within to the summit of the island, 315 feet (96^m0) high, with a prominent mound on it. A rock, above water, lies close off the south-eastern point of the island, and a reef, with a depth of 2 fathoms (3^m7) over it, extends about 2 cables southward from this rock. A rock, above water, lies about one cable off the south-western point of Chin-li hsü, and is connected to it by a reef; a rocky ledge, which dries 15 feet (4^m6), lies about 3 cables west-south-westward of this point.

Ta-san-p'an shan lies about half a mile south-eastward of Chin-li hsü, and is separated from that island by San-pang men or Sanpwan pass, a deep passage with a navigable width of about 2 cables, which forms the north-eastern entrance to Tung-t'ou hsia. San-chiao hsü (yu), an islet 64 feet (19^m5) high, lies about 3 cables south-westward from the south-western point of Ta-san-p'an shan, on the edge of the drying flat extending from the northern coast of Tung-t'ou shan; another islet, with a reef extending from its eastern and western points, lies about one cable northward of San-chiao hsü. There is a narrow boat channel between Ta-san-p'an shan and Tung t'ou-shan; a rocky islet, with a rock awash close off its eastern side, lies in the middle of this passage. During the south-west monsoon good anchorage can be obtained off the northern side of Ta-san-p'an shan.

Light.—A light is exhibited, at an elevation of 296 feet (90^m2), from a white tower, 17 feet (5^m2) in height, situated on the south-eastern side of Chin-li hsü.

Wen-chou wan.—**Islands and dangers.**—**Caution.**—Wen-chou wan or Wenchow bay (Wen-chow yang) is the name given to the area entered between Hu-tou hsü and Nan-ch'iang (page 274), situated about 10 miles northward, and which lies outside the larger islands lying across the entrance to Ou chiang. Depths of from 4 to 6 fathoms (7^m3 to 11^m0) were reported, in 1949, in the eastern part of the area, as indicated on the chart, and vessels should therefore navigate with caution.

Charts 1754, 1759, 2412, 1262, 1263.

Chart 1763.

Mao-ts'ao shan, 126 feet (38^m4) high, situated about 3½ miles east-north-eastward of Wen-tzu t'ou, is the largest of a group of islets and numerous rocks; Tung hsü (yu) (*Lat.* 27° 56' N., *Long.* 121° 13' E.), the south-eastern islet of the group, is 107 feet (32^m6) high. Chu-wu (Chu-hu) tao, the northern islet of the group, is 70 feet (21^m3) high; Ssu hsü, 74 feet (22^m6) high, lies close westward of it.

P'ing-t'ou (Tung-huan) shan or Kwangta island is a large island lying with its south-western extremity about 2½ miles north-westward of Mao-ts'ao shan; the western part of the island is the highest, and rises to an elevation of 785 feet (239^m3) at Lu-chi shan. Chang-yu chiao, a rock 6 feet (1^m8) high, lies close off the south-western point of the island. Tao-kan-t'ang or Ts'ang-yü chiao, 119 feet (36^m3) high, is a group having the appearance of a long narrow islet, lying about 3½ cables south-eastward of Three Graves point, the southern point of the island, and the fairway of the channel between is deep. Pai-lung hsü (yu), 96 feet (29^m3) high, is one of several small islets lying on the outer edge of a shoal extending about 3 cables southward near the eastern extremity of the island. Jo-li chiao is the outermost of some islets off the eastern point; a rock, which dries 14 feet (4^m3) lies about a quarter of a mile southward of it.

Nan-ch'iang lies nearly 1½ miles east-north-eastward of the eastern point of P'ing-t'ou shan, and is 195 feet (59^m4) high; Pei-ch'iang, 181 feet (55^m2) high, lies about a quarter of a mile north-north-eastward of Nan-ch'iang, with three small islets between; the group is known as Shuang-p'ai tao. A shoal, with depths of less than 5 fathoms (9^m1) over it, extends about half a mile north-westward from Nan-ch'iang.

There is a clear channel between P'ing-t'ou shan and the Mao-ts'ao-shan group, but a bank, with general depths of from 4 to 5 fathoms (7^m3 to 9^m1) over it, extends nearly 1½ miles southward from the eastern part of P'ing-t'ou shan. Huang-ta hsia (strait), situated between the western side of P'ing-t'ou shan and the eastern side of Huang-ta-ao tao (Ta-men shan), lying about 1½ miles westward, is deep and clear, except for an 11-foot (3^m4) rocky patch near the fairway about half a mile south-westward of the western extremity of Tao-kan-t'ang, at the south-eastern end of the strait.

Pi-chia chiao lies about three-quarters of a mile north-eastward of Wen-tzu t'ou, the north-eastern point of Chuang-yüan-ao shan, and is a remarkable, steep, jagged, dark brown islet, 135 feet (41^m1) high at its north-eastern end; at a distance the islet appears to be split in the middle, but such is not the case, as the higher portions are connected. Hsia-ma chiao, lying about 4 cables south-westward of Pi-chia chiao, is a brown, rocky islet 50 feet (15^m2) high.

A 3-fathom (5^m5) rocky patch lies near the fairway of the channel between these two islets which is otherwise deep; the channel between Hsia-ma chiao and Chuang-yüan-ao shan is deep and clear.

Islands off the northern mouth of Ou chiang.—Anchorage.—
Beacon.—Chung shan, 739 feet (225^m2) high, lies nearly 2½ miles westward of Pi-chia chiao (*Lat.* 27° 55' N., *Long.* 121° 10' E.) and is remarkable in appearance; the land rises gradually from the various points on the northern, western, and eastern sides in long spurs till nearly half-way up, then it rises abruptly to the summit,

Charts 1754, 1759, 2412, 1262, 1263.

Chart 1763.

the sides being rocky ; on the southern side the ascent is more gradual, and there are two shoulders of lesser elevation.

Hsiao-chung shan or Hokin island lies about a quarter of a mile off the eastern coast of Chung shan and is 155 feet (47^m2) high ; the passage between is shoal. A rocky ledge extends about one cable from the eastern point of Hsiao-chung shan. Chi-kuan chiao lies about 3 cables south-eastward of the south-eastern point of Chung shan and is a rugged islet 30 feet (9^m1) high ; rocks above water and sunken rocks extend about one cable northward and south-westward from it.

A spit, with depths of less than 3 fathoms (5^m5) over it, extends about 7 cables north-westward from the north-eastern extremity of Chung shan.

Chung-shan sha-tsui (spit), which dries in places, extends about 3½ miles westward from Hsi-shan tsui, a point situated on the western side of Chung shan.

Fairly sheltered anchorage can be obtained south-westward of Chung shan, in depths of from 4 to 7 fathoms (7^m3 to 12^m8), but there are numerous fishing stakes in this locality.

Huang-ta-ao tao (Ta-men shan), the largest of the northern group of islands lies with its southern extremity (*Lat.* 27° 56' N., *Long.* 121° 05' E.) about 1½ miles north-westward of Chung shan. It is mountainous, a steep ridge running from east to west through its north-western part ; the highest peaks of this ridge are Ta-men shan, 1,221 feet (372^m2) high, situated nearly 1½ miles north-eastward of Huang-ta tsui, the south-western point of the island, and Huang-ta-ao shan, 1,287 feet (392^m3) high, situated about one mile south-westward of the north-eastern point of the island. A peak, with a boulder on its summit, lies about half a mile southward of Huang-ta-ao shan and is prominent, rising abruptly to an elevation of 1,155 feet (352^m0). The southern coast of the island is described with Pei-shui-tao (North passage) on page 276.

Hsiao-men shan or Junk island, 450 feet (137^m2) high, lies off the north-western coast of Huang-ta-ao tao, and is separated from it by Ta men, a passage about 3 cables wide in its narrowest part, with depths of over 3 fathoms (5^m5) except at the western end, where there is a flat with depths of only a few feet.

Pei-hsiao-men shan (Ta-wu-hsing), 247 feet (75^m3) high, and Wu-ch'eng hsü (Hsiao-wu-hsing), 145 feet (44^m2) high, are, respectively, the largest of two groups of islets lying off the north-western coast of Hsiao-men shan and separated from it by Hsiao men, a passage about a quarter of a mile wide. It was reported, in 1954, that there was a beacon on Wu-ch'eng hsü.

Ou chiang.—**General remarks.**—Ou chiang (kiang) flows out southward of Wen-chou tsui or Wenchow point (Chi tou), a point on the mainland about 4½ miles north-westward of Huang-ta tsui, and about 26 miles north-eastward of Ching-fang t'ou (page 267). It has a general westerly direction as far as Yung-chia-cheng, formerly named Wen-chou, a walled city, with a population, in 1952, of about 140,000, situated on the southern bank about 20 miles above Wen-chou tsui. From Yung-chia-cheng to Chu-chou, a distance of about 60 miles, it has a general west-north-westerly direction. Craft of about 20 tons can ascend the main river for about 30 miles above

Chart 1763.

Yung-chia-cheng, when the rapids commence and the tidal influence ends; smaller craft can ascend to Chu-chou.

The entrance to Ou Chiang is divided into two parts by Ling-k'un-t'u (Wen-chow flats), extensive drying flats which extend practically from the south-western end of I-hsü shan north-westward to Ling-k'un (Wen-chow tao), a low cultivated island, lying with its eastern extremity about 3 miles west-south-westward of Wen-chou tsui (Lat. $27^{\circ} 59' N.$, Long. $120^{\circ} 58' E.$). South entrance, the channel southward of Ling-k'un-t'u, has silted up, so that only North entrance, the channel northward of these flats, is available for shipping. The channel of the river, and also the banks, are continually changing.

There are five channels giving access to North entrance, namely:—Nan shui-tao (South passage), described on page 277, between Chuang-yüan-ao shan and Chung shan; Pei shui-tao (North passage), described below, along the southern side of Huang-ta-ao tao; Ta men, between Huang-ta-ao tao and Hsiao-men shan; Hsiao-men, between Hsiao-men shan and the islets northward of it; and Sha-t'ou shui-tao (channel), north-westward of Hsiao men. Pei shui-tao is the only channel available for shipping; Nan shui-tao and Ta men are used by junks.

It is not safe to proceed above the anchorage eastward of Ch'ing-ling hsü (yu), described below, off the southern coast of Huang-ta-ao tao, without a pilot, as the river changes with extraordinary rapidity, at times even from day to day. In 1937 the least depth in the channel of the river as far as Yung-chia-cheng was 5 feet (1^m5).

Vessels drawing up to 15 feet (4^m6) can enter the river and proceed to the port of Wen-chou (page 278) at neaps; vessels drawing up to 18 feet (5^m5) can do so at springs.

Fishing stakes abound between Wen-chou tsui and Huang-ta-ao tao, but there are comparatively few in the river itself.

Health.—The diseases of Yung-chia-cheng are cholera, ague, ophthalmia, and small-pox; elephantiasis exists, but leprosy is very rare. These diseases are confined to the native population, and the city may be considered generally healthy for a Chinese town. The most healthy time of the year is from December to February, inclusive, and the most unhealthy, June and July.

Swept areas.—Considerable areas in the outer approaches to North entrance have been examined by sweeping.

Pilots.—There are no licensed pilots for Ou Chiang, but local pilots are available. Application should be made as early as possible to the Harbour-master of the Port of Wen-chou. The pilot meets vessels off Wen-chou tsui.

Pei shui-tao.—Dangers.—Beacon.—Anchorage.—The southern coast of Huang-ta-ao tao between Tung t'ou (Lat. $27^{\circ} 58' N.$, Long. $121^{\circ} 09' E.$), its eastern extremity, and a point situated about 3 miles west-south-westward, is bold and cliffy; about midway between these two points there are some black jagged rocks under the cliffs, with some rocks, which dry 10 feet (3^m0), lying near the coast close eastward of them. About half a mile westward of Tung t'ou is a small bay which affords shelter to junks and boats in the north-east monsoon, but a heavy swell sets in; a rock close off the western shore of the bay dries 12 feet (3^m7). A small bay immediately north-eastward of the southern extremity of Huang-ta-ao tao affords shelter

Charts 1754, 1759, 2412, 1262, 1263.

Chart 1763.

for boats under some rocks close off its eastern entrance point ; a rock, which dries, lies close off the southern extremity of Huang-ta-ao tao.

Between the southern extremity of Huang-ta-ao tao and Huang-ta tsui, situated about $2\frac{1}{2}$ miles westward, is a bay entirely occupied by a flat which dries. Ch'ing-ling hsü (yu), situated about 6 cables westward of the southern extremity of Huang-ta-ao tao, rises to a sharp peak 151 feet (46^m0) high ; some smaller rocks lie off its southern side. See view facing page 271. There is well sheltered anchorage eastward of this rock, in a depth of 6 fathoms (11^m0), good holding ground of stiff mud. A rock, awash, lies about $1\frac{1}{2}$ cables south-westward of Huang-ta tsui.

Ch'uang-tai hsü (yu), 53 feet (16^m2) high, lies about three-quarters of a mile north-westward of Huang-ta tsui, on the drying flat which extends about a quarter of a mile from the western coast of Huang-ta-ao tao.

Tao-tzu sha, forming the southern side of Pei shui-tao (North passage), is a long, narrow shoal, which dries in patches, running nearly parallel to the western half of the southern coast of Huang-ta-ao tao at a distance of from a half to one mile.

San-chiao sha lies on the northern side of the channel and between Huang-ta tsui and Wen-chou tsui ; it consists of drying banks which are continually shifting. A conical stone beacon, with a flat top, stands on San-chiao sha and nearly $1\frac{1}{2}$ miles eastward of Wen-chou tsui.

Nan shui-tao.—Dangers.—Nan shui-tao (South passage) is entered between Chuang-yüan-ao shan and Chung shan, and runs along the southern side of Chung-shan sha-tsui.

Wu-shih chiao, which dries 4 feet (1^m2) lies on the southern edge of the channel, about one mile west-south-westward of the north-western point of Chuang-yüan-ao shan. Ni chiao and Hsiao-ni hsü (yu) lie off the northern side of I-hsü shan. Yang-she sha-tsui (spit) is a spur projecting from Ling-k'un-t'u across the northern end of I-hsü shan.

Nan shui-tao passes between Chung-shan sha-tsui and Yang-she sha-tsui, and thence between Ling-k'un-t'u and Chung sha, a middle ground situated between Ling-k'un-t'u and Tao-tzu sha.

Wen-chou tsui to Yung-chia-cheng.—Buoys and beacons.—It was reported, in 1954, that there was a beacon on the coast about half a mile south-westward of Wen-chou tsui. An isolated range of hills runs along the northern side of the entrance for a distance of about $2\frac{1}{2}$ miles westward of Wen-chou tsui ; Ch'ih-t'ou (Chi-tou) shan, the highest part of this ridge, lies about 6 cables west-south-westward of Wen-chou tsui and is 415 feet (126^m5) high. Huang-hua-tsun is a village at the western end of the range. The channel runs along the northern shore of the river between this village and Lo shan, situated about 5 miles westward ; this shore is fronted by a sea wall, the land within being low, flat, and cultivated, with numerous villages. Ho-yu shan, situated about $2\frac{1}{2}$ miles north-westward of Wen-chou tsui, is a smooth round-topped, isolated range 595 feet (181^m4) high ; close westward is Shan-hou kang, a range of reddish hills. Hsiao-chiang shan, situated about 2 miles north-eastward of Lo shan, has several trees on its summit ; Ta-chiang shan, lying

Charts 1754, 1759, 2412, 1262, 1263.

Chart 1763.

about half a mile northward of Hsiao-chiang shan, is of dark appearance and also has some trees on its summit. Lo shan is a small, rocky eminence, with some trees on it; about 2 cables eastward of it is another small eminence. Just within these two points is Pang-shih-wei, a walled town.

Ling-k'un (page 276), the island lying in the middle of the entrance, is surrounded by a sea wall. Shuang-kun shan, its western extremity, is 96 feet (29^m3) high, and about one cable westward of it is a rock of about the same elevation; Tan-kun shan, lying nearly 7 cables eastward of Shuang-kun shan, is a round-topped mound, 142 feet (43^m3) high, on the northern coast of Ling-k'un, with several red sand patches showing through the grass. These eminences are prominent from the river entrance.

Lung-wan t'ou is situated on the southern side of the river and about 2½ miles westward of Shuang-kun shan; between Lung-wan t'ou and Yen-shan tsui, situated nearly 1½ miles westward, the land is low, cultivated, and faced by a sea wall. A range of hills rises to a summit of 970 feet (295^m7) high, named Huang-shih shan, nearly 2 miles south-eastward of Lung-wan t'ou. Southward and south-westward of Yen-shan tsui the land is mountainous; Chien-yen shan, 690 feet (210^m3) high, lies about half a mile south-westward of Yen-shan tsui, and there is a prominent sharp peak, 1,547 feet (471^m5) high, named Cone peak, about 3 miles south-westward of this point. See view facing page 271.

Above Lung-wan t'ou (*Lat.* 27° 58' N., *Long.* 120° 48' E.) the centre of the river is occupied by partially drying flats which extend for a distance of nearly 6 miles above Lo shan. On these flats are Jen-chou-ch'ien-tu (Jen-chow-chien-tu) and Chi-tu-tu, both of which islands are flat, low, cultivated and inhabited; they are surrounded by sea walls. The navigable channel is southward of these islands. The southern bank of the river above Yen-shan tsui is low, flat and cultivated, with numerous houses, and generally fronted by a sea wall; the cultivated land extends from one to 3 miles inland, where it terminates on the slopes of the mountain ranges. The tanks of the Standard Oil Company are situated on the northern bank of the river, about 1½ miles north-westward of the north-western point of Chi-tu-tu.

Nan-chi (Nan-hsi) chiang, a tributary of Ou chiang, enters the river on the northern side just below Yung-chia-cheng; San-liu-chia is an island on the eastern side of its entrance.

Pang-shih-hsi shan, 1,220 feet (371^m9) high, Wu-niu shan, 1,430 feet (435^m9) high, and Tai-mo-chuan, 1,546 feet (471^m2) high, are summits on the northern shore between Lo shan and San-liu-chia.

Li-yu shan, 1,320 feet (402^m3) high, lies on the southern side of the river about 4 miles southward of Yung-chia-cheng.

The navigable channel of the river above Ling-k'un is marked by buoys and beacons, and these are altered as necessary to conform with the constant changes which take place in the bed of the river.

Wen-chou port.—Harbour limits.—Islands and dangers.—Wen-chou port, situated off Yung-chia-cheng affords berths for a limited number of vessels drawing from 15 to 20 feet (4^m6 to 6^m1). The lower harbour limit is about 4 miles above the western end of Chi-tu-tu and the upper limit is about 2 miles further up river. Lin-chiao-

Charts 1754, 1759, 2412, 1262, 1263.

Chart 1763.

chien, an islet awash at high water springs, lies on the edge of a drying flat which extends from the northern shore of the harbour. Kiang-hsin-szu is an islet lying in mid-channel opposite the city, on a flat which dries; there are pagodas near each end of this island. Elephant rock, which dries about 10 feet (3^m0), lies about three-quarters of a cable southward of the eastern point of this islet. Foul ground, with a least depth of 3 feet (0^m9) over it, extends about one cable north-eastward from the north-eastern side of Kiang-hsin-szu (*Lat.* 28° 02' N., *Long.* 120° 38' E.); about two-thirds of the width of the passage between the eastern end of this islet and the Custom house on the southern bank of the river is occupied by a sandbank which dries, whilst over the remaining part there is a depth of not more than about 4 feet (1^m2). The Custom house is situated near the centre of the northern wall of the city.

Anchorage.—Vessels laden with petroleum products or explosives must anchor within an area extending from about abreast the eastern bank of Nan-chi Chiang to about 1½ miles down river. The quarantine anchorage is below the above anchorage.

Harbour facilities.—**Supplies.**—**Communications.**—There are five wharves, with depths of from 12 to 20 feet (3^m7 to 6^m1) alongside.

There are two large and several smaller hospitals at Yung-chia-cheng.

Small quantities of fresh provisions are obtainable and good quality drinking water is plentiful. Fuel oil is obtainable in moderate quantities.

There is regular steamer communication with Shang-hai, Hong Kong, and other ports. Yung-chia-cheng is connected to the general telegraph system; telegrams can be relayed to countries overseas.

There is a long distance telephone to Shang-hai and other cities.

Harbour regulations.—The following are extracts from the Harbour regulations for the port of Wen-chou, which were in force in 1948:—

1.—The term "vessel" in these regulations refers to vessels of foreign type.

3.—Vessels entering the harbour will be boarded by a Berthing officer, who will direct them to proper berths.

5.—Vessels shall moor in accordance with instructions from the Harbour-master, and shall not shift berth without special permission, except when outward bound after having obtained their clearance papers.

6.—Applications for berths or for permission to shift must be made at the Harbour-master's office by the master, the first officer, or the pilot in charge, when the necessary instructions concerning the berth will be given. If a vessel be instructed by the Harbour-master to shift her berth, she shall do so.

7.—Vessels arriving with mineral oil, or cargo of a highly inflammable nature, shall anchor in the appropriate anchorage, and must remain there until all such cargo is discharged. Vessels loading such cargo shall do so only where it is permitted to be discharged, and from there proceed to sea. Vessels in the ordinary anchorage are permitted to handle a quantity of kerosene not exceeding 50 cases or their cubic equivalent when the oil is packed in barrels, drums, etc.

Vessels owned or chartered by companies which have established tank installations outside harbour limits, having anchored in the

Charts 1754, 1759, 2412, 1262, 1263.

Chart 1763.

appropriate anchorage, shall there await Customs inspection before being allowed to proceed alongside the installations.

All vessels carrying oil are required to take such precautions as are customary in their trade.

9.—Vessels having on board as cargo any high explosives or the specially prepared constituents of such, any loaded shells or more than 100 pounds of gunpowder, any quantity of small-arm cartridges in excess of 50,000 rounds, or any other fixed ammunition of which the aggregate quantity of powder charges exceeds 100 pounds, shall anchor in the appropriate anchorage, and fly a red flag at the fore ; and in regard to the discharge of the same, they shall abide by the instructions received from the Customs.

Vessels having to receive on board any such explosives shall observe similar precautions.

This rule shall not apply to small-arm cartridges when carried in a properly constructed magazine, so fitted as to admit of its being flooded by a sea-cock operated from the upper deck, in which case the number of cartridges allowed to be carried is not limited.

10.—Men-of-war and other government vessels may, on application to the Harbour-master, be permitted to take on board or tranship explosives in the ordinary anchorage, provided that such explosives are handled only by their own crews under the command of an officer.

13.—Every craft, of whatever description, conveying explosives through any part of the waters of the port shall exhibit a red flag, not less than 6 feet by 4 feet (1^m8 by 1^m2), at the foremast head or where it can best be seen ; and in the case of all boats or lighters thus employed which are not fitted with masts, the red flag must be exhibited at a height of not less than 12 feet (3^m7) above the highest part of the deck or house.

16.—Vessels having any infectious disease on board, or any disease suspected to be infectious, or the body of a person who died, or is suspected of having died, of an infectious disease, shall, on approaching the port, hoist the quarantine flag, anchor in the quarantine anchorage, and keep that flag flying until pratique has been granted.

No person shall be permitted to leave or board such a vessel without a permit from the Harbour-master or Port Health officer.

Vessels arriving from any port declared to be infected shall conform to such quarantine regulations as may from time to time be enacted.

19.—Ballast, ashes, garbage, refuse, spoil obtained by dredging or otherwise, etc., must not be thrown into the river. Vessels wishing to discharge ashes or other refuse should hoist the International Code flag Y at the fore truck, when a licensed ash-boat will attend and take delivery.

21.—Vessels are required to conform to the " Regulations for Preventing Collisions at Sea ".

22.—Vessels are forbidden to proceed at such a speed through the harbour as renders their wash dangerous to properly laden cargo boats and sampans.

23.—The blowing of steam whistles or sirens, except for the purpose of signalling in accordance with the " Regulations for Preventing Collisions at Sea," or for the purpose of warning vessels of danger, is strictly forbidden.

Charts 1754, 1759, 2412, 1262, 1263.

Chart 1763.

24.—All vessels shall keep on board a sufficient number of hands to clear and pay out chain. The hawse must always be kept clear.

25.—No vessels, except men-of-war, may use swinging booms. Swinging booms should be rigged in from sunset to sunrise. 5

27.—No merchant vessel shall fire cannon or small-arms within the harbour.

30.—In the case of fire occurring on board a vessel in port, the fire bell must be rung immediately by that vessel, and by those above and below her, and the signal NH, International Code ("Fire, want immediate assistance") hoisted by the burning vessel, if possible, and by those above and below her, during the day, or a light lowered and hoisted continually, during the night. Notice should immediately be given to the Harbour-master. 10

Landing places.—Boats can land at a stone slip abreast the Custom house at Yung-chia-cheng, and also at a pontoon, with a depth of 3 feet (0^m9) alongside, situated nearly one mile below the Custom house on the same side of the river. 15

Port Signals.—The following special signals, by flags of the International Code of Signals, were in use at the port of Wen-chou, in 1948, in addition to those given on page 32. 20

Signal	Meaning	
Flag F	Mails for the Chinese Post Office	
Flag L	Customs Officer wanted	
Flag N	Berthing Officer wanted	25
Flag Y	Ash boat wanted	

Typhoon signals.—Typhoon signals are hoisted on a flagstaff at the Custom house. The signals and their meanings are as follows:—

A triangular shape (apex upward) indicates a typhoon within 400 miles of Yung-chia-cheng. 30

A square shape indicates a typhoon within 200 miles of Yung-chia-cheng.

A circular shape indicates a typhoon threatening Yung-chia-cheng (*Lat.* 28° 01' N., *Long.* 120° 39' E.).

A triangular shape (apex downward) indicates typhoon passed. 35

The meteorological information on which these signals are based is received by telegraph from Shang-hai. At times the receipt of a typhoon warning signal is delayed by the typhoon itself.

The signal for a typhoon threatening Yung-chia-cheng is hoisted, independently of a message from Shang-hai, when a barometer in the Custom house reads 29.65 inches or lower. 40

Vessels in the harbour should prepare to get steam at short notice, when the first of the above signals is displayed.

Tidal streams.—The in-going tidal stream near Ch'ing-ling hsü has a maximum rate of 2 knots, the out-going stream 2½ knots. After passing Ch'ing-ling hsü the water changes from clear and salt to muddy and brackish. Off Huang-ta tsui the stream changes from in-going to out-going gradually through north, and from out-going to in-going through south; slack water lasts but a few minutes.

The duration of the in-going stream off Wen-chou tsui (*Lat.* 27° 59' N., *Long.* 120° 57' E.) is 5½ hours, and its greatest rate is 3 knots; the duration of the out-going stream is 7 hours, and its greatest rate 4½ knots. The out-going stream through the channel southward of Ling-k'un may attain a rate of about 5 knots; the tidal streams here

Chart 1763.

continue to run for about 25 minutes after the times of high and low water.

In Wen-chou port the average duration of the flood tide is $4\frac{1}{2}$ hours, and that of the ebb $7\frac{1}{2}$ hours; the tidal streams continue for 38 minutes after the times of high and low water. During freshets, which occur in April, May, and June after heavy rains, the out-going stream sometimes runs for a whole day at a maximum rate of about 6 knots.

10 *Chart 1759.*

COAST.—Ou chiang to Shih-p'u chiang.—General remarks.—

From Ou chiang, the coast trends generally north-eastward for about 90 miles to Shih-p'u chiang (Shih-phu harbour), and is very irregular. This stretch of coast contains several deep indentations, and is fronted

15 by numerous islands, many of which are 10 miles or more offshore. *Charts 1763, 1759.*

Coast.—Between Wen-chou tsui and Hebe head, situated about 23 miles east-north-eastward, the coast recedes and forms a deep indentation which is largely filled by Yu-huan tao, a large island 1,174
20 feet (357^m8) high. Between the western end north-western sides of Yu-huan tao and the mainland are situated Lo-ch'ing wan and Lo-ch'ing ao, which are described below. The north-eastern corner of Yu-huan tao is separated from the mainland by a narrow strait which connects Hsuan-men wan, described on page 284, with Lo-
25 ch'ing ao. Pai-kang-chien, also known as Mount Rambler, is 3,600 feet (1,097^m3) high, and lies about 7 miles westward of the head of the indentation.

Lo-ch'ing wan and approach.—Anchorage.—Lo-ch'ing ao.—

Islands.—Lo-ch'ing or Lotsing wan is bounded westward by the
30 main coast northward of Wen-chou tsui, and eastward by Yu-huan or Yuhwan tao; the latter is situated with Kan-lu tsui, its south-western point, about $3\frac{1}{2}$ miles northward of the western extremity of P'ing-t'ou shan. The western side of the bay is shoal, but the eastern side is generally fairly deep. Good anchorage can be ob-
35 tained off the southern part of the western coast of Yu-huan tao, where there are general depths of from 5 to 8 fathoms (9^m1 to 14^m6); it is available in a typhoon. Vessels using this anchorage are warned that fishing stakes extend across the eastern side of the bay about 2 miles northward of Kan-lu tsui (*Lat. 28° 02' N., Long. 121° 09' E.*).

40 *Chart 1759.*

The western entrance point of the bay is situated about 4 miles north-north-eastward of Wen-chou tsui, and is hilly, rising to an elevation of about 490 feet (149^m3) about three-quarters of a mile inland. The western shore between this point and a point situated
45 about 9 miles north-north-eastward is fronted by a coastal bank which dries out as much as 3 miles in places. Northward of a line joining the latter point and Lien hsü, an islet lying close off the north-western extremity of Yu-huan tao, is Lo-ch'ing ao, an estuary encumbered with many islands and extensive sandbanks which
50 extend from either shore; this estuary extends for over 15 miles in a northerly direction, and can also be entered from Hsuan-men wan.

The principal islands in Lo-ch'ing ao are Mao-yen shan, 342 feet

Charts 1754, 2412, 1262, 1263.

Chart 1759.

(104^m2) high, and Hsi-men shan, 1,304 feet (397^m5) high, situated, respectively, about 5 and 12 miles north-north-eastward of Lien hsü. Chiang-yen shan, 449 feet (136^m9) high, situated about 2 miles north-north-eastward of Lien hsü, is the largest of many islands between 5
Mao-yen shan and the entrance. Ta-wu, 270 feet (82^m3) high, and Hsiao-wu, 170 feet (51^m8) high, lying, respectively, about 1½ miles west-south-westward and south-westward of Chuang-yen shan, are situated near the middle of the entrance. A shoal spit extends south-south-westward from Mao-yen shan to within about half a mile 10
of Ta-wu. A line of six islands, from 126 to 241 feet (38^m4 to 73^m5) high, crosses the estuary not far northward of Mao-yen shan. The principal channel is on the western side of the estuary, westward of Ta-wu and the spit extending south-south-westward from Mao-yen 15
shan. The head of the estuary can also be reached by a channel entered between Ta-wu and Hsiao-wu, and passing westward of Chuang-wen shan and eastward of Mao-yen shan. These two channels lead, respectively, westward and eastward of Hsi-men shan. 15
Chart 1763.

A rock awash lies nearly one cable off the western side of Kan-lu 20
tsui. Heng-chih shan, an island 390 feet (118^m9) high, lies about three-quarters of a mile southward of Kan-lu tsui; a shoal, with depths of less than 3 fathoms (5^m5) over it, extends about 3 cables from the north-western side of Heng-chih shan, and Kan-lu chiao, a detached rock with a depth of 8 feet (2^m4) over it, lies about 7 25
cables northward of the south-western point of this island. Two rocky shoals, with depths of 10 and 28 feet (3^m0 and 8^m5) over them, lie about 2½ and 3½ cables eastward, respectively, of the eastern extremity of Heng-chih shan. There is a deep and clear channel between Heng-chih shan and Kan-lu tsui; this channel and an area 30
at the southern end of the eastern side of Lo'ch'ing wan have been examined by sweeping.

The passage between Heng-chih shan and P'ing-t'ou shan (page 274), south-eastward, is about 2 miles wide, with depths of less than 3 fathoms (5^m5) over the greater part; the centre of this passage has 35
been swept to a depth of 13 feet (4^m0).

Charts 1763, 1759.

Southern coast of Yu-huan tao.—Anchorage.—K'an-men wan.—
Anchorage.—Hsuan-men wan.—The southern coast of Yu-huan tao between Kan-lu tsui (*Lat.* 28° 02' N., *Long.* 121° 09' E.) and Lo-shih 40
chiao, a point lying about 4 miles eastward is cliffy and fairly steep-to; the latter point is the western entrance point to a bay almost entirely occupied by a flat which dries. Wai-huang-men (Huang men) shan, an island 425 feet (129^m5) high, lies nearly half a mile off the eastern entrance point of this bay, with an islet, 198 feet (60^m3) 45
high and almost connected to the coast of Yu-huan tao by a reef, between. Wai-huang men, the passage between this islet and Wai-huang-men shan, has a least depth of 6½ fathoms (11^m4) in the fairway, but it is narrowed to a width of about one cable by an islet lying close off the north-western point of the latter island. 50

The area between Yu-huan tao and P'ing-t'ou shan forms a sheltered anchorage known as Ch'i-k'ou yang.

Chart 1759.

K'an-men wan (Kemong harbour) has its main entrance between

Charts 2412, 1262, 1263.

Chart 1759.

Wai-huang-men shan and Nan-p'ai shan, an island, 338 feet (103^{m0}) high, lying about 1½ miles north-eastward; it affords sheltered anchorage for small vessels, but the space is somewhat restricted, as
 5 the head of the bay is shoal. Huang-niu chiao (Meier rock), which dries 7 feet (2^{m1}), lies in the main entrance and about 4 cables off the western side of Nan-p'ai shan; a reef, which dries 4 feet (1^{m2}), with a rock awash close northward of it, lies about half a cable off the western side of Nan-p'ai shan, and foul ground extends for about 1½
 10 cables from its eastern point. A 3-fathom (5^{m5}) patch lies about a quarter of a mile southward of the western end of Nan-p'ai shan, and an islet lies close off its north-western point. Tung men, the passage between Nan-p'ai shan and the coast between K'an-men t'ou, the south-eastern extremity of Yu-huan tao, and a point situated
 15 about 1½ miles westward, is about 1½ cables wide and has a least depth of 5 fathoms (9^{m1}) in the fairway; on the northern side of this passage is a small islet named Kuan-ti hsü.

Hsuan-men wan is a shoal bay, lying between the eastern coast of Yu-huan tao and the main coast north-westward of Hebe head
 20 (page 282); broad flats, which dry, extend from both shores of the bay, and Chung-tan hsü an islet, 70 feet (21^{m3}) high, and some rocks lie on the eastern side. There are fishing stakes in the approach to Hsuan-men wan, from 1½ to 2½ miles south-eastward of K'an-men t'ou. Hsuan-men wan is connected with Lo-ch'ing ao by a narrow
 25 passage leading along the northern side of Yu-huan tao; this passage is only available for small craft, and the narrowest part, where there is a sharp bend near Hsuan t'ou, the north-eastern point of Yu-huan tao, situated about 7 miles northward of K'an-men t'ou, is even dangerous.

30 **Lights.**—A light is exhibited, at an elevation of 163 feet (49^{m7}), from a white masonry tower, 15 feet (4^{m6}) in height, on K'an-men t'ou.

A light is exhibited, at an elevation of 69 feet (21^{m0}), on the point on the mainland on the northern side of the narrows between
 35 Hsuan-men wan and Lo-ch'ing ao.

Off-lying islands and dangers.—**Anchorage.**—Huo-ch'a shan (Chin-ki), 188 feet (57^{m3}) high, lies with its north-eastern point about 1½ miles southward of Hebe head; Yuan hsü, an islet 120 feet (36^{m6}) high, lies close northward of the western extremity of Huo-ch'a shan
 40 and on the drying bank which extends from the northern coast of that island. Yang hsü (Tauan island) lies about three-quarters of a mile north-eastward of Huo-ch'a shan; the passage between should not be attempted, as a sunken rock lies in the middle, and a reef extends north-eastward from Huo-ch'a shan. There are several
 45 rocks and shoal water between Yang hsü and Hebe head.

Ta-lu shan (Taluk), 770 feet (234^{m7}) high, the highest island in this vicinity, lies about 2 miles southward of Yang hsü, with an islet and some rocks between. There is anchorage for vessels with local knowledge, in depths of from 3 to 4 fathoms (5^{m5} to 7^{m3}), between
 50 Huo-ch'a shan and Ta-lu shan (*Lat.* 28° 05' N., *Long.* 121° 24' E.).

Ch'ien shan, the northernmost of the three Seoluk islands, lies about 1½ miles southward of Ta-lu shan, and vessels using the passage between should hold the northern side. The southern island is named Chiang-mang shan.

Charts 2412, 1262, 1263.

Chart 1759.

P'i (Pe) or Pen shan lies about $4\frac{1}{2}$ miles eastward of Ta-lu shan ; there are several rocks around this island, and two islets lie close together about half a mile southward of its south-eastern point. Fishing stakes, connected by strong ropes, extend from a position about 9 miles southward to a position about 9 miles eastward of P'i shan. 5

Flare islet, situated about one mile north-westward of P'i shan, is low and flat. T'ung-chen or Sugarloaf, an islet with an islet or rocks close northward of it, lies about $1\frac{1}{2}$ miles northward of Flare islet. 10

Coast.—Off-lying islands and dangers.—Between Hebe head and Liu-t'ou tsui (Song-men point), situated about 13 miles east-north eastward, the coast recedes and forms Ai-wan (Ye-van bay), which is generally shoal. Ta-ao shan is a point situated about 4 miles north-north-eastward of Hebe head, and about 2 miles further northward there is a group of islets and rocks extending about 2 miles offshore. 15 Another group of islets and rocks lies westward and north-westward of Liu-t'ou tsui, the outermost lying nearly 3 miles west-north-westward of the point. Liu-t'ou tsui is the south-western extremity of Sung-men shan (Tau-pung island), an island almost connected to the mainland by flats, through which is a narrow passage, named Penetration pass, used by native craft ; on the mainland opposite the northern end of the island is Sung-men (Song-men), a walled town. 20

A flat rock, with a sunken rock about $1\frac{1}{2}$ cables north-eastward of it, lies about $2\frac{1}{2}$ miles south-westward of Liu-t'ou tsui ; another flat rock, with a rock awash close off its south-eastern side, lies nearly 3 miles south-south-eastward of the same point. 25

San-suan shan (San-shi), with two reefs close off its western side, lies about $2\frac{1}{2}$ miles south-eastward of Liu-t'ou tsui ; there are several rocks and reefs within a distance of one mile off the southern end of Sung-men shan. An islet, with a reef off its north-eastern end, lies about $1\frac{1}{2}$ miles south-eastward of San-suan shan, and there is another islet between. An islet, with a reef off its southern side, lies about one mile northward of San-suan shan. There is a navigable channel, about one mile wide, with a least depth of 4 fathoms (7^m3), between these islets and the rocks lying off the southern end of Sung-men shan, but it should not be used without local knowledge. 30

Lo hsü (Soudan island), the easternmost island in this locality, is about 120 feet (36^m6) high and lies about 5 miles east-north-eastward of San-suan shan, and there is a reef close off its southern side. The Stragglers are a group of rocks lying about $1\frac{1}{2}$ miles south-westward of Lo hsü (*Lat. $28^{\circ} 16' N.$, Long. $121^{\circ} 44' E.$*). See view facing page 286. 40

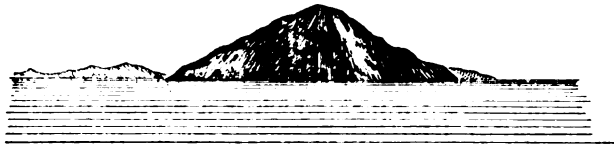
Niu shan (Shetung), 568 feet (173^m1) high, lies about midway between Lo hsü and the eastern coast of Sung-men shan ; a reef lies about 3 cables off its southern side, and there are several rocky islets off its south-eastern side. Two islets lie between Niu shan and the eastern coast of Sung-men shan ; the eastern islet is named La-t'ou shan, and the western Ko-hai shan. A reef, with three rocks above water on it, extends about one mile north-eastward from La-t'ou shan, leaving a channel, with a least depth of $3\frac{1}{2}$ fathoms (5^m9) between it and Niu shan. The passage between the two islets is not navigable. 45

The coast northward of Sung-men shan is fronted by a coastal bank, about 6 miles wide in places ; this bank is fringed by a chain of islands

Charts 2412, 1262, 1263.

Chart 1759.

and rocks. Ch'ien-sha-men shan (Crookback island), with numerous rocks around, lies about $1\frac{1}{2}$ miles north-eastward of the northern end of Sung-men shan, and is the south-eastern of these islands; Lang-chi shan, lying with its southern end about $7\frac{1}{2}$ miles north-north-westward of Ch'ien-sha-men shan, is the largest of these islands. Pai-yen shan (Pwan-ma island) lies westward of Ch'ien-sha-men shan, and Huang-chiao shan (Kin-sing) lies about $1\frac{1}{2}$ miles south-eastward of Lang-chi shan, with Pai-kuo shan between. Ta-chiang yang (Shoal bay) is entered southward of Huang-chiao shan. The islands northward of Lang-chi shan are described on page 288. Several islets and dangers lie outside this chain. Chiku shan, the southernmost of these, lies about $1\frac{1}{2}$ miles eastward of Ch'ien-sha-men shan, and rises in a cone to an elevation of 760 feet (231^m6); there is a broad yellow stripe on its south-eastern side, and it is an excellent landmark. *See view.*



Chiku shan.
Bearing NWd., distance 2 miles.
(Original dated 1943).

Kuei hsü (Low Chikhok), with Half-tide rock about 3 cables north-eastward of it, is an islet lying about one mile north-north-westward of Chiku shan; *see view* facing this page. The channel between Chiku shan and Ch'ien-sha-men shan is narrowed to a width of about one mile by rocks extending from the latter. The s.s. *Store Nordiske*, with a draught of 16 feet (4^m9), reported having struck an obstruction probably a rock, in 1907, when three-quarters of a mile north-westward of Chiku shan. A rock, awash, lies nearly 3 miles north-north-westward of Kuei hsü, and nearly 4 miles further in this direction is Li-yu-pei chiao, a rock which dries about 7 feet (2^m1). The outer islands north-westward of Li-yu-pei chiao are described with T'ai-chou (Taichow) wan on page 288.

Light.—A light is occasionally exhibited from Lo hsü (Lat. $28^{\circ} 16'$ N., Long. $121^{\circ} 44'$ E.).

T'ai-chou lieh-tao.—**Shoal.**—**Anchorage.**—Shang hsü (Hea-chu), the southernmost of T'ai-chou lieh-tao (Tai-chau islands), lies about $9\frac{1}{2}$ miles eastward of Chiku shan and is 468 feet (142^m6) high; it is cliffy except on its northern side; there is a prominent yellow streak on its south-eastern side, and close off its southern point is Finger rock, a remarkable rock, 169 feet (51^m5) high (*see view* facing this page). There are also other rocks close off the south-eastern side and the eastern extremity of Shang hsü. Hsia hsü (Kisan), 339 feet (103^m3) high, lies about one mile north-westward of Shang hsü, and is cliffy except on its northern side; there are rocks close off its south-eastern and north-eastern extremities. About midway between Hsia hsü and Shang hsü are three islets and a number of rocks, the western islet being called Chung hsü; there is no passage between these three islets and Shang hsü. Nu-hsin chiao, a rock which dries 10 feet (3^m0), lies about one mile west-south-westward of Hsia

Charts 2412, 1262, 1263.

Sung-men shan.



San-suan shan (San-shi).

Strugglers.

*Lo k'ü (Soudan I.),
bearing 270°, 124 miles.*

Southern end of Sung-men shan (Tau-pung island), with adjacent islands and rocks.



Chiku shan.

*Finger rock,
bearing 293°, 7 miles.*

Shang hsü.

T'ai-chou lieh-tao (Tai-chau islands): Shang hsü (Hea-chu) and islets westward.



*I-chiang shan
(Squall islands).*

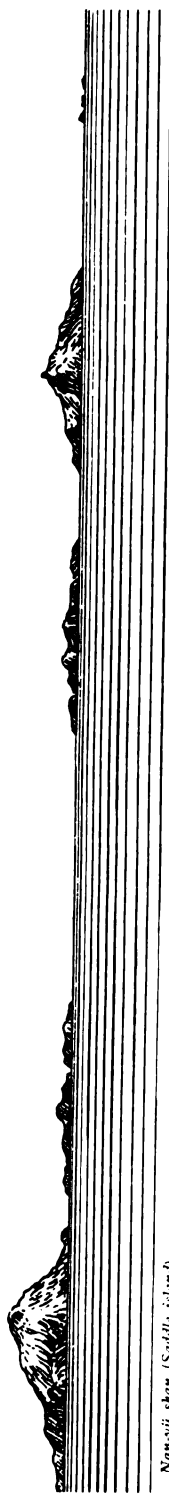
*Pai-chia shan
(Crate island).*

*Liang-mao hsü.
(Fir cone).*

*T'ou-men shan (Chu-su)
bearing 288°, 204 miles.*

Islands in the approach to T'ai-chou (Taichow) wan.
(Originals dated 1935).

To face page 287.



Nan-yü shan (Saddle island),
bearing 315°, 10 miles.

Yü-shan lieh-tao (Hieshan islands) from south-eastward.
(Original dated 1844).

Yu-san chiao
(Mushroom islet)

Pei-yü shan
(Shaho island).



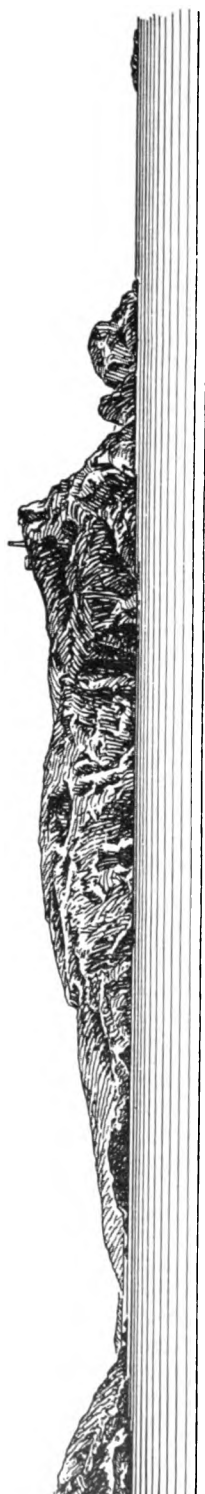
Nan-yü shan, bearing 245°, 6 miles.

Pei-yü shan.

Yü-shan lieh-tao from eastward.
(Original dated 1844).

Niu-ou chiao
(Cheng rock).

Yu-san chiao.



Pei-yü shan (Shaho island) from southward.
(Original dated 1932).

Chart 1759.

hsü, and about 6 cables south-westward of Nu-hsin chiao is Lien-tzu chiao, a rock or islet 14 feet (4^m3) high. There are numerous fishing stakes between Chung hsü and Nu-hsin chiao.

A shoal, with a depth of 3½ fathoms (6^m9) over it, the position of which is approximate, was reported, in 1939, about 4½ miles southward of Shang hsü. 5

Hsia-ta-ch'en shan (Hea ta) lies with its south-western point about 1½ miles north-westward of Hsia hsü; the highest part of the island, in about the middle, attains an elevation of 738 feet (224^m9). Chu 10
hsü, an islet 180 feet (54^m9) high, lies about half a mile westward of the south-western extremity of Hsia-ta-ch'en shan, and the passage between is dangerous, as rocks extend about 2 cables from the eastern side of Chu hsü. Sun hsü is a small islet connected to the south-western end of Chu hsü by a reef; foul ground extends about half a 15
mile southward from Chu hsü, and on it is Ken hsü and some rocks above water. A spit, with a rock, named Ju hsü on the outer end, which dries 3 feet (0^m9), extends about a quarter of a mile north-north-eastward from the northern side of Chu hsü; Yu-wei chiao, a rock with a depth of 3 fathoms (5^m5) over it, lies about 3½ cables 20
northward of Chu hsü. Ping-feng shan, an islet 307 feet (93^m6) high, with some islets or rocks close off its northern end, lies close off the north-eastern point of Hsia-ta-ch'en shan; its northern and south-eastern ends are cliffy.

Shang-ta-ch'en shan (Shang-ta), the next island northward of Hsia- 25
ta-ch'en shan, is 669 feet (203^m9) high. Some islets lie within a distance of one mile from the south-western side of the island; Yu-mu chiao, with a depth of 2 fathoms (3^m7) over it, lies about 3 cables south-westward of Chu-yao hsü, the outer islet, which is 138 feet (42^m1) high. A coastal bank, with depths of less than 3 fathoms 30
(5^m5) over it, extends as much as 1½ miles from the western side of Shang-ta-ch'en shan between Chu-yao hsü and a peninsula about 1½ miles northward; Huang hsü and some above-water and sunken rocks lie within a quarter of a mile of the western extremity of this peninsula. The northern extremity of Shang-ta-ch'en shan is a small 35
peninsula, 366 feet (111^m6) high, joined to the main part by a low, very narrow isthmus; foul ground, on which is Chi-mei chiao, a rock 2 feet (0^m6) high, extends about a quarter of a mile from the north-eastern point of this peninsula. Shang-tsao-hsieh chiao, which dries 13 feet (4^m0), lies 2 cables offshore about half a mile southward of the 40
eastern point of Shang-ta-ch'en shan.

Anchorage with good holding ground is available westward of Shang-ta-ch'en shan. The channel between that island and Hsia-ta-ch'en shan can be reached from either eastward or westward, but approaching from the latter direction there are depths of not more 45
than 4½ fathoms (7^m8) north-eastward of Chu hsü (*Lat.* 28° 26' N., *Long.* 121° 51' E.); numerous fishing stakes are laid in both entrances to this channel, from one to 6 miles eastward of the group, and off the northern point of Shang-ta-ch'en shan. There are depths of less than 5 fathoms (9^m1), or about one fathom (1^m8) less than those charted, 50
between Shang-ta-ch'en shan and the coast. This island, and also Hsia-ta-ch'en shan, are inhabited.

Ch'ing hsü (Shang rock), an islet 217 feet (66^m1) high, with two islets or rocks close off its south-eastern side, lies about 2 miles north-east-

Charts 2412, 1262, 1263.

Chart 1759.

ward of the northern extremity of Shang-ta-ch'en shan ; the channel between them is deep.

Light.—A light is occasionally exhibited from Ping-feng shan.

6 **T'ai-chou wan.**—**Islands.**—**Anchorage.**—T'ai-chou (Taichow) wan lies between Lang-chi shan (page 286) and Tsingtang tsui (Pi-su point), situated about 15 miles northward ; the area southward of the mouth of Chiao chiang (kiang), which flows into the head of the bay, is partly occupied by T'ai-chou ch'ien-t'an (Taichow flats), which extends to as

10 much as 4 miles from the western shore of the bay and dry ; flats which dry extend from the northern shore to a distance of nearly 6 miles southward of Tsingtang tsui. Between these flats there is a channel, with depths of from 4 to 9 feet (1^m2 to 2^m7), which leads to the town of Hai-men, situated at the entrance to Chiao chiang.

15 Tung-lang, an islet 242 feet (73^m8) high, with an islet off its north-western side and a rock off its north-eastern point, lies about $1\frac{1}{2}$ miles eastward of the north-eastern point of Lang-chi shan ; Hsi-lang, another islet, 163 feet (49^m7) high, lies about half a mile southward of Tung-lang, and there is an islet and some above-water rocks

20 between. A rock, which dries 4 feet (1^m2), lies about a quarter of a mile north-westward of Tung-lang. San-shan-t'ou, an islet 213 feet (64^m9) high, lies about $1\frac{1}{2}$ miles northward of the north-western point of Lang-chi shan, and is the northernmost and largest of four islets lying off this point ; Shang hsü lies close south-westward of San-shan-

25 t'ou, to which it is connected at low water ; Chung chiao, 52 feet (15^m8) high, lies midway between San-shan-t'ou and Lang-chi shan, and Po hsü lies close off the north-western point of the latter island.

Pai-sha shan, 249 feet (75^m9) high, situated about 5 miles south-south-westward of Tsingtang tsui, is the largest of a group of islets

30 and rocks lying on the flat which extends from the northern shore of the bay. An islet, 275 feet (83^m8) high, lies close off the eastern end of Pai-sha shan. Chu hsü and Hsiao-p'u hsü lie, respectively, off the northern and southern sides of Pai-sha shan, and Ta tao and Ch'uang chiao lie about one mile westward of the same island.

35 The town of Hai-men or Hai-men-chen (*Lat.* $28^\circ 41' N.$, *Long.* $121^\circ 56' E.$), with a population of about 20,000, and connected to the general telegraph system, is situated on the southern bank of the Chiao chiang, just within the entrance. The town of Ch'ien-so lies on the northern bank, opposite Hai-men. A middle ground,

40 which partly dries, extends about 2 miles westward from a position about 3 cables northward of the western end of the town, leaving a channel, with depths of from 8 to 12 feet (2^m4 to 3^m7), on either side ; north-eastward of the town there is a small area in the river with depths of from 3 to $4\frac{1}{2}$ fathoms (5^m5 to 8^m2).

45 A depth of about 20 feet (6^m1) can be carried into the harbour at high water. There is good anchorage for about 20 vessels drawing not more than 18 feet (5^m5).

Several piers extend from the shore fronting Hai-men. Moderate quantities of fuel oil are available.

50 About 6 miles above Hai-men, the river bifurcates, Ling chiang (kiang) being the northern, and Yungning chiang (kiang) the southern branch.

Light.—A light is exhibited from a white tower, 15 feet (4^m6) in height, on the southern entrance point of Chiao chiang.

Charts 2412, 1262, 1263.

Chart 1759.

Islands and dangers in the approach to T'ai-chou wan.—Beacon.—Anchorages.—I-chiang shan (Squall islands), situated about $8\frac{1}{2}$ miles east-north-eastward of Tung-lang, consists of two islands so close together that they appear as one except on east-north-easterly and west-south-westerly bearings. The northern island is 423 feet (128^m9) high, and some rocks lie within a distance of half a mile north-westward of its north-western side, and a rock, awash, lies nearly 2 cables northward of its north-eastern point; foul ground extends nearly 3 cables from the south-eastern side of the southern island. A group of rocks lies about $2\frac{3}{4}$ miles west-north-westward of the northern island. 5 10

Pai-chia shan (Crate island), situated about $2\frac{1}{4}$ miles eastward of I-chiang shan, is clifty and 259 feet (78^m9) high; an islet lies close off its western end, and a reef extends about 2 cables from its eastern end. See view facing page 286. 15

T'ou-men shan (Chu-su) lies about $5\frac{1}{2}$ miles north-westward of Pai-chia shan, and rises to a sharp cone, 670 feet (204^m2) high, in the eastern part of the island; there is a beacon on the summit of the western part of the island. Three rocks above water lie nearly midway between T'ou-men shan and I-chiang shan (*Lat.* $28^\circ 36' N.$, *Long.* $121^\circ 48' E.$), and a sunken rock lies about 2 cables south-south-eastward of the southern of them. Liang-mao hsü (Fir Cone) is a rocky islet lying about $2\frac{3}{4}$ miles south-eastward of the southern point of T'ou-men shan. Good anchorage can be obtained, by vessels with local knowledge, between the southern point of T'ou-men shan and an islet, with a reef off its north-eastern side, lying about half a mile south-westward of this point. Ta-chu is the north-western of several islets and rocks situated north-westward of T'ou-men shan, but this area is of no importance to general navigation, as there are depths of less than 3 fathoms (5^m5) between this island and the coast southward of Tsingtang tsui. 20 25 30

Tung-chi shan (Tung-chu) lies nearly 5 miles eastward of T'ou-men shan, and is 700 feet (213^m4) high; foul ground, with some rocks above water, extends about one mile southward from the south-western point of Tung-chi shan, and depths of less than 3 fathoms (5^m5) extend about 2 miles west-south-westward from the same point. An islet, and a group of rocks, lie about midway between T'ou-men shan and Tung-chi shan; the passage between this islet and Tung-chi shan should not be attempted. Wu-p'eng hsü (Reef islet), with an islet or rock close northward of it, lies about $2\frac{1}{4}$ miles south-south-westward of Tung-chi shan; a reef extends about 4 cables eastward from Wu-p'eng hsü. Anchorage can be obtained in the north-east monsoon, by vessels with local knowledge, under the southern side of Tung-chi shan, but there is generally a heavy swell. 35 40 45

Kao tao (Gau-tau island) lies about $2\frac{1}{4}$ miles west-north-westward of Tung-chi shan, and is 627 feet (191^m1) high; Gao tao lies off its north-eastern point, to which it is almost connected. Some rocks above water lie within one mile of the southern extremity of Kao tao, and foul ground extends about three-quarters of a mile from its western side; a rock, which dries about 7 feet (2^m1) lies about 3 cables northward of the north-eastern point of Gao tao. 50

Ta-o-kuan or Kin-men tao (Kin-men island) lies northward of Kao tao, and between these two islands is Barren bay. Some rocks

Charts 2412, 1262, 1263.

Chart 1759.

lie close off the salient points on the eastern side of Ta-o-kuan, and a mud spit, with depths of from 4 to 5 fathoms (7^m3 to 9^m1) over it, extends about $1\frac{1}{4}$ miles north-north-eastward from the north-western point of Kao tao. Nine Pin island is separated from the south-western extremity of Ta-o-kuan by a deep but narrow channel, which terminates abruptly in the coastal bank, with depths of less than 3 fathoms (5^m5), extending from the mainland. Nine Pin island is divided into two parts by a sandy isthmus, on which is a rock from which the island is named. Indifferent shelter may be obtained between Nine Pin island and Kao tao, by vessels with local knowledge, in depths of from 3 to 6 fathoms (5^m5 to 11^m0).

Ta-lo (Pine Cone islet) lies about $2\frac{1}{4}$ miles north-north-westward of the south-western end of Nine Pin island (*Lat.* $28^\circ 46' N.$, *Long.* $121^\circ 49' E.$); there are several rocks above water and sunken rocks in this locality, and the depths are probably less than those charted. Hsiao-lo and Jo-mao-p'eng hsü are situated, respectively, about one mile north-eastward and 2 miles north-north-westward of Ta-lo. Hsiao-o-kuan (Fall island) lies about $1\frac{1}{4}$ miles northward of Ta-o-kuan, and is 247 feet (75^m3) high; foul ground, with two small islets on it, extends about half a mile from its western end.

Light.—Fog signal.—A light is exhibited, at an elevation of 150 feet (45^m7), from a black iron framework tower, 32 feet (9^m8) in height, with a white dwelling, on the summit of Ta-chu.

A fog signal is occasionally sounded from the light-structure.

Yü-shan lieh-tao.—Yü-shan lieh-tao (Hieshan islands) consists of three inhabited islands and several rocky islets. Nan-yü shan (Saddle island), the southern island, has a saddle-shaped summit, 411 feet (125^m3) high, and lies nearly 20 miles eastward of Hsiao-o-kuan; rocks lie close off its north-eastern and south-eastern points.

Pei-yü shan (Shaho island), situated about one mile north-eastward of Nan-yü shan, is cliffy at its southern end. An island, with a small islet off its southern side, lies close off the south-western point of Pei-yü shan, and close westward of this islet is Pai chiao, an islet with a rock awash about 2 cables off its southern side; several islets or rocks, including Wu-hu chiao, lie within a distance of 6 cables eastward of Pei-yü shan, and foul ground extends about 4 cables off its north-western side.

Niu-ou chiao (Cheng rock) is an islet lying about half a mile north-eastward of the northern point of Pei-yü shan. Yu-san chiao (Mushroom islet) lies about one mile northward of Niu-ou chiao (*Lat.* $28^\circ 54' N.$, *Long.* $122^\circ 16' E.$), and is so much undermined by the sea that it bears some resemblance to a large mushroom; a rock, awash, lies about a quarter of a mile northward of this islet, and nearly 2 miles north-eastward is a rock with a depth of $1\frac{1}{4}$ fathoms (2^m3) over it. See views facing page 287.

Light.—A light is exhibited, at an elevation of 340 feet (103^m6), from a white circular iron tower, 55 feet (16^m8) in height, on the summit of a remarkable cliff at the south-eastern end of Pei-yü shan; see view facing page 287.

Coast.—Off-lying islands and dangers.—Yutin point is situated about $2\frac{1}{4}$ miles northward of Tsingtang tsui (page 288), and some above-water and sunken rocks lie within a distance of one mile from it; Mount Bassett rises about 3 miles south-westward of the point.

Charts 2412, 1262, 1263.

Chart 1759.

Between Yutin point and a point situated about 5 miles northward is the entrance to Po-pa Chiang, an inlet which extends about 8 miles westward. A coastal bank, which dries, extends about 2 miles from the southern side of the entrance, and on it are the two islands Hsia-ma or Ha-mo shan and Chu-men shan, almost connected to each other and to the coast about one mile north-north-westward of Yutin point. Chang-hua-wan shan, an island, 695 feet (211^m8) high, with several islets and rocks around, lies in the entrance to Po-pa Chiang and about 3 miles northward of Yutin point, leaving a channel on either side of it; in Pai-tai men, the southern channel, which is about half a mile wide, there are depths of from 3 to 4 fathoms (5^m5 to 7^m3) in the fairway, and in Niu-tou men, the northern channel, which is about 2 cables wide, there are depths of from 1½ to 4 fathoms (2^m7 to 7^m3); the depths seaward of these channels are, however, considerably less.

Nan-tse, an islet 259 feet (78^m9) high, lies about 4½ miles east-north-eastward of Yutin point; Pei-tse (Chain islands), 236 feet (71^m9) high, lies about one mile northward of Nan-tse, and a chain of islets and rocks extends about one mile west-south-westward from it. Tien-chuang shan, an islet 52 feet (15^m8) high, lies about 2 miles westward of Nan-tse, and there are two rocks, 29 feet (8^m8) and 56 feet (17^m1) high, respectively, close off its south-western side. Niao hsü, 139 feet (42^m4) high, lies about three-quarters of a mile north-westward of Tien-chuang shan. Ta-chi shan, with several other islets and rocks around, lies nearly 2 miles north-north-eastward of Niao hsü. Wu-chih shan lies south-eastward of Ta-chi shan, and Hsiao-chi shan lies between Ta-chi shan and the mainland.

A bar extends across the entrance to Po-pa Chiang. The least depth over it in the approach to Pai-tai men southward of Nan-tse is 9 feet (2^m7), that in the approach to Niu-tou men is 5 feet (1^m5); the eastern end of the latter channel is encumbered by above water rocks, and rocks which dry.

San-men wan.—General remarks.—San-men wan (San-mun bay) is a large estuary extending generally north-westward for a distance of over 20 miles. The outer part of its northern side is formed by two large islands, Niu-t'ou or Niutow shan (Ni-tiu island) and Chien-yang tao (Kin-yang island), 1,080 feet and 889 feet (329^m2 and 271^m0) high, respectively, which together form the southern side of Shih-p'u Chiang (page 295). San-men wan is entered between Niu-chiao-men, a point situated about 7 miles northward of Yutin point, and Hsiao-hsin chiao (Cape Conway), the south-eastern point of Niu-t'ou shan, situated about 14 miles north-eastward.

The bay contains numerous islands and dangers, and its inner waters are encumbered by extensive drying banks. Hai-yu Chiang (Hae-yu river) and Ch'i-men Chiang (Ning-hau river) flow into the north-western corner of the bay, and other rivers and streams discharge into the northern side of the head of the bay.

Chart 1759, plan of Shih Phu road and harbour.

Islets and dangers in the entrance and approaches to San-men wan.—San-men tao (San-mun island) is the largest of a group of islets, with foul ground between them, lying about 3 miles north-eastward of Niu-chiao-men, and is 181 feet (55^m2) high. A chain of islets and reefs extends about 3½ miles north-westward from San-men tao;

Charts 2412, 1262, 1263.

Chart 1759, plan of Shih Phu road and harbour.

Wu-tzu tao is the largest and highest of the north-western group of these islets, and rises to an elevation of 276 feet (84^m1). The channel westward of this chain of islets and reefs, called Niu-t'ou yang, has depths of from 3½ to 4 fathoms (5^m9 to 7^m3) in the fairway; P'ing chiao (*Lat.* 28° 59' N., *Long.* 121° 44' E.), a rock 4 feet (1^m2) high, surrounded by a reef, lies at the north-western end of this channel and about 2½ miles northward of Niu-chiao-men.

Nan shan (Lea-ming island), 506 feet (154^m2) high, lies close off the southern point of Niu-t'ou shan; Chiliu tsui is its southern point. Tsao-hsieh-pa hsü (Sanchesan), an islet lying about 2½ miles south-westward of Nan shan, is divided into three parts, the northern being 84 feet (25^m6) high. There are depths of from 4½ to 5 fathoms (7^m8 to 9^m1) in the fairway between Tsao-hsieh-pa hsü and San-men tao, and from 5½ to 7 fathoms (9^m6 to 12^m8) between Tsao-hsieh-pa hsü and Nan shan.

Nu-ying chiao (Heroine rock) lies nearly 3 miles east-south-eastward of Nan shan, and dries 4 feet (1^m2). Tsai-hua-chi (The Twins) consists of two islets lying about half a mile apart, with sunken rocks between; the western islet, situated about 1½ miles north-eastward of Nu-ying chiao, is 100 feet (30^m5) high, and the eastern and larger islet is 151 feet (46^m0) high. Mi-to tao (Medusa rock), situated about one mile northward of the western islet of Tsai-hua-chi, is 139 feet (42^m4) high.

Chart 1759.

San-men wan.—Coast.—Islands and dangers.—From Niu-chiao-men, the coast trends north-westward for about 11 miles to Mao-t'ou-shan tsui, and is very irregular. Niu-shan tsui lies about 4½ miles north-north-westward of Niu-chiao-men, and between this point and Mao-t'ou-shan tsui a group of islands, of which Ta-kou shan is the largest, lies on the coastal bank. Immediately southward of Ta-kou shan is the entrance to Chien-t'iao chiang which leads to Chien-t'iao-so-cheng (Kien-tiu), a town on the northern bank about 2 miles within the entrance.

From Mao-t'ou-shan tsui, the coast trends westward for about 10 miles to the head of the bay.

Chart 1759, plan of Shih Phu road and harbour.

The first 10 miles on the northern shore of the bay consist of the southern coasts of Niu-t'ou shan and Chien-yang tao, which are separated from each other by Lin-men chiang, a narrow passage giving access to Shih-p'u chiang.

Ta-fu tao (island), which is separated from Chien-yang tao by a narrow channel, lies on the northern side of the bay, with its southern extremity about 5½ miles westward of Nan shan (*Lat.* 29° 02' N., *Long.* 121° 56' E.); Ta-fu t'ou (Albert peak), a remarkable peak shaped like a thumb, 1,004 feet (306^m0) high, rises on the northern end of the island, and P'ao-t'ai shan (Cairn mount), 604 feet (184^m1) high, is near its southern point. Chia shan (Cone islet), 352 feet (107^m3) high, lies about one mile south-westward of the southern extremity of Ta-fu tao, and there are some rocks between; a reef, with two rocks above water on it, extends fully a quarter of a mile from the southern side of Chia shan, and a rocky islet lies about 3 cables east-south-eastward of it; a rock, above water, lies nearly three-quarters of a mile north-westward of Chia shan.

Charts 2412, 1262, 1263.

Chart 1759, plan of Shih Phu road and harbour.

Nan-tien wan is a shallow bay between Nan shan and Ta-fu tao ; Lin-men chiang is situated at its head.

Chart 1759.

Yang chiao is an islet or rock lying about 4 miles westward of Chia shan. Man shan (St. George island) lies about $2\frac{1}{2}$ miles north-north-eastward of Yang chiao and is 165 feet (50^m3) high ; this island lies off the entrance to a passage, with a depth of only a few feet in its southern part, which leads northward to the head of Shih-p'u chiang (page 295). Hsia-wan shan, situated about 2 miles north-north-westward of Yang chiao, is the southernmost of a group of islands situated on a drying bank which extends about $2\frac{1}{2}$ miles north-westward ; Ch'ing-men shan (Tinwan island), 640 feet (195^m1) high, is the largest of this group, and lies about $1\frac{1}{2}$ miles eastward of Mao-t'ou-shan tsui. For 2 miles northward of the northern end of this group there is a chain of islets and rocks, the northernmost of which are on the edge of the coastal bank which extends from the northern shore of the bay. Mao-t'ou yang, the passage westward of Hsia-wan shan and the islands northward, has a deep fairway more than half a mile wide on its north-eastern side ; Man-shan yang, the passage eastward of these islands has many rocks in it, and is dangerous for navigation.

She-p'an shan (Quarry island), 234 feet (71^m3) high, is situated on a mud flat and about 4 miles west-north-westward of Mao-t'ou-shan tsui (*Lat. $29^\circ 06' N.$, Long. $121^\circ 39' E.$*) ; She-p'an yang is the passage southward of this island, with a least depth of 3 fathoms (5^m5) in the fairway, which leads to the entrances of Hai-yu chiang and Ch'i-men chiang. T'ao-t'ou shan (Nox island), 254 feet (77^m4) high, situated about 2 miles west-south-westward of She-p'an shan, is the eastern and larger of two islands on a drying flat between the entrances of these two rivers. Hai-yu chiang runs southward of T'ao-t'ou shan ; northward of this island, the channel bifurcates, and Ch'i-men chiang is the northern branch.

Chart 1759, plan of Shih Phu road and harbour.

Approaches to Shih-p'u chiang.—Island.—The approaches to Shih-p'u chiang from northward or southward are northward and southward, respectively, of T'an-t'ou shan (Tan-tau san and San-tau san), an island divided into two parts by a low shingle isthmus, lying with its south-western point about $1\frac{1}{2}$ miles eastward of the north-eastern point of Niu-t'ou shan ; the southern part of the island is 737 feet (224^m6) high, and the northern part 536 feet (163^m4) high.

Shih-p'u mao'ti (Shih-phu road) lies in the southern approach.

Southern approach.—Islets and dangers.—Anchorage.—Tidal streams.—A shoal, with a depth of $4\frac{1}{2}$ fathoms (8^m2) over it, was reported, in 1945, by a vessel which grounded on it in the south-eastern approach to Shih-p'u chiang about 8 miles south-eastward of the eastern extremity of T'an-t'ou shan. A rocky spit extends nearly three-quarters of a mile south-south-eastward from Ta-pi chiao (Nose islet), 138 feet (42^m1) high, which lies close off the eastern coast of Niu-t'ou shan and about $2\frac{1}{2}$ miles north-north-westward of Mi-to tao. Feng-tou chiao (Ellis islet) lies about $2\frac{1}{2}$ miles east-north-eastward of Ta-pi chiao and is 106 feet (32^m3) high ; there are depths of from $4\frac{1}{2}$ to 5 fathoms (7^m8 to 9^m1) in the passage between these two islets. Ni-lo chiao (Yi-lu) lies about $1\frac{1}{2}$ miles north-north-eastward

Charts 2412, 1262, 1263.

Chart 1759, plan of Shih Phu road and harbour.

of Feng-tou chiao, and from a short distance it appears as two islets ; the northern part is 160 feet (48^m8) high, and the southern part is 68 feet (20^m7) high.

- 5 Shih-p'u mao-ti lies between the south-western end of T'an-t'ou shan and the northern part of the eastern side of Niu-t'ou shan ; it affords indifferent anchorage, in depths of from 3½ to 5½ fathoms (6^m4 to 10^m1), mud, but the tidal streams may attain a rate of about 2½ knots, and there is usually a heavy swell.

10 *Chart 1759.*

Northern approach.—Islets and dangers.—Pan-ch'ao chiao (Half-tide rock), a rock which dries 14 feet (4^m3), lies about 6 miles north-eastward of the north-eastern point of T'an-t'ou shan ; when covered this rock is not readily seen when the sea is smooth.

- 15 San-yüeh shan (Cliff islets) consists of three islets and a number of rocks lying close together ; the northernmost and highest islet lies about 4½ miles northward of the northern point of T'an-t'ou shan and is 153 feet (46^m6) high. Hsing chiao, a rock which dries 2 feet (0^m6), lies about one mile north-eastward of the northern islet of San-yüeh shan. So shan, an islet 142 feet (43^m3) high, lies about three-quarters of a mile southward of the southern islet of San-yüeh shan.

Chart 1759, plan of Shih Phu road and harbour.

- Several islets lie off the eastern and north-eastern coasts of T'an-t'ou shan. Niao chiao, the easternmost of these, lies about 1½ miles north-eastward of the eastern point of this island ; La-t'ou hsi, with 25 foul ground around, which extends to a distance of half a mile from its eastern side, lies about half a mile westward of Niao chiao. Kao chiao is a group of three islets, almost connected to each other, lying within a distance of 6 cables north-eastward of the north-eastern 30 point of T'an-t'ou shan ; the southern and highest of these three islets is 232 feet (70^m7) high. Huo-yu chiao, a reef which dries, lies close eastward of the middle islet. Chi-lung chiao (*Lat.* 29° 14' N., *Long.* 122° 03' E.), an islet 124 feet (37^m8) high, lies nearly one mile north-north-eastward of the north-eastern point of T'an-t'ou shan.

- 35 T'ung-t'ou shan, 561 feet (171^m0) high, and the eastern of a group of three islands (Bangao islands), lies about 1½ miles north-westward of the northern point of T'an-t'ou shan and on the northern side of the northern approach to Shih-p'u chiang ; foul ground, with two islets on it, extends about a quarter of a mile from the north-eastern 40 side of T'ung-t'ou shan. Niu-lan-chi (Wang-chi) 433 feet (132^m0) high, lies close westward of T'ung-t'ou shan, and is separated from it by Chü-shu men. T'ung-pan chiao (Bangao rock), a rock awash, lies about a quarter of a mile southward of the eastern point of Niu-lan-chi. Lo-po shan, 232 feet (70^m7) high, lies close off the north- 45 western point of Niu-lan-chi, and is separated from it by Tan-shui men.

- The northern part of the channel between the western side of T'an-t'ou shan and the entrance to Shih-p'u chiang is encumbered with islets and rocks. Ch'eng-chu chiao (Ching shu), the northernmost of these islets, lies about 2 miles south-westward of the northern point of 50 T'an-t'ou shan, and consists of two islets joined together by a reef ; the western islet is 105 feet (32^m0) high. Ta-niao chiao (Da-wu), 105 feet (32^m0) high, lies about half a mile southward of Ch'eng-chu chiao. There are two rocks, awash, and a rock, 4 feet (1^m2) high, in the passage eastward of these islets.

Charts 2412, 1262, 1263.

Chart 1759, plan of Shih Phu road and harbour.

Shih-p'u chiang.—**Islands and dangers.**—Shih-p'u chiang (Shih-phu harbour) is bounded southward by Niu-t'ou shan and Chien-yang tao, and northward by the mainland. The entrance, between the northern end of Niu-t'ou shan and the mainland, is obstructed by two islands, the northern of which is named Nan-hui shan (Tungmun island), and the southern Ta-men tao (Tai-mun), leaving only a narrow channel northward and southward of them, respectively; Tung men, the passage between these two islands, is not navigable, as Sphinx rock lies in the middle of its entrance. 5

Hsia-wan men, the channel between Niu-t'ou shan and Ta-men tao, is only about one cable wide in its narrowest part, but is deep throughout the fairway; there is, however, a least depth of $3\frac{1}{2}$ fathoms (6^m4) in the approach. The south-eastern entrance is obstructed by foul ground with some islets on it, which extends nearly three-quarters of a mile north-eastward from the southern entrance point, leaving only a narrow passage, with a sharp bend in it, on the northern side; Chin-lung chiao, the largest of these islets, is 93 feet (28^m3) high. At the north-western end of Hsia-wan men are the two islets Ta-mao-chu and Mao-han shan; there is a deep channel between these two islets, and also between Ta-mao-chu, the western islet, and the northern extremity of Niu-t'ou shan. Huang-p'ang chiao, a rock above water, lies about half a mile south-westward of the western point of Ta-mao-chu and about one cable off the northern coast of Niu-t'ou shan. 10 15 20 25

Tung-wa men, the northern entrance channel, is more tortuous than Hsai-wan men, but it is always used by junks; the fairway is deep, but there is a least depth of $2\frac{1}{4}$ fathoms (4^m1) in the approach. The entrance to Tung-wa men (*Lat.* $29^{\circ} 13' N.$, *Long.* $121^{\circ} 57' E.$), between the north-eastern point of Nan-hui shan and the mainland, is nearly one cable wide. Immediately within this entrance the channel widens out to a basin, which is, however, encumbered by islets and shoals, leaving a passage along the northern side of Nan-hui shan about $1\frac{1}{2}$ cables wide. The channel turns sharply southward off the north-western point of Nan-hui shan, and is from $1\frac{1}{2}$ to 2 cables wide between the shoals which extend from either side; the town of Shih-p'u (Shih-phu) is situated on the western side of this part of the channel. 30 35

Within the entrance, Shih-p'u chiang runs west-south-westward for about 4 miles and then turns westward for a further 3 miles, and has several islands in it. Chung-chieh shan, an island 351 feet (107^m0) high, lies with its eastern extremity nearly $2\frac{1}{4}$ miles south-westward of Ta-mao-chu, and the bank on which it lies divides the deeper portions of the harbour, north-eastward and westward of this island, respectively, into two parts; the western part is called Jo-yü yang. Foul ground extends about half a mile north-north-eastward from the eastern point of Chung-chieh shan. The channel northward of Chung-chieh shan is deep, but there is a least depth of $3\frac{1}{2}$ fathoms (6^m4) in its eastern approach. The channel southward of Chung-chieh shan is obstructed at its western end by a bar with a least depth of $2\frac{1}{4}$ fathoms (4^m6) over it. Lao-shu shan, 66 feet (20^m1) high, lies about a quarter of a mile eastward of the eastern end of Chung-chieh shan, near the eastern end of a middle ground in the southern channel. A shoal, with a depth of $1\frac{1}{2}$ fathoms (2^m7) over it, lies midway between Lao-shu shan and the shore south-eastward. 40 45 50

Charts 2412, 1262, 1263.

Chart 1759, plan of Shih Phu road and harbour.

Niu-wu chiao, 3 feet (0^m9) high, lies close inshore southward of Lao-shu shan.

On the southern side of the harbour, and about one mile southward of the western extremity of Chung-chieh shan, is the entrance to Ling-men chiang, a narrow channel which runs between Niu-t'ou shan and Chien-yang tao into Nan-tien wan (page 293). A bank, with depths of from 4 to 5 fathoms (7^m3 to 9^m1) over it, lies across the central part of this channel, which is otherwise deep, but there is a depth of only 4 feet (1^m2) in its southern approach.

An island, separated from the northern shore by a narrow channel named Han-tien men, lies just westward of Chung-chieh shan; Ta-kuchi, 243 feet (74^m1) high, is situated near its eastern end. P'u-t'o men is a narrow channel entered about 2 miles westward of the western end of Chung-chieh shan, and leading north-westward; T'u-ti chiao is a small islet off its entrance, and Wa-mo chiao is one of two small islets lying about half a mile further westward. About one mile further westward are two islands, with deep but narrow channels between them and also northward and southward of them; San-men shan is the northern island; the southern island is 162 feet (49^m4) high.

Chart 1759.

There is deep water for about 1½ miles westward of San-men shan (Lat. 29° 09' N., Long. 121° 49' E.), and the channel then starts to shoal, and leads north-westward into Yüeh-ching yang (Ta-hwa inlet). Lu-yeh-t'ou is a small island lying on the southern side of the channel about 2 miles westward of San-men shan; Wa-chan chiao is a drying rock lying about a quarter of a mile eastward of Lu-yeh-t'ou.

Chart 1759, plan of Shih Phu road and harbour.

Lights.—A light is exhibited, at an elevation of 107 feet (32^m6), from a framework structure on the north-eastern point of Ta-men tao.

A light is exhibited, at an elevation of 123 feet (37^m5) from a white tower, with dwelling, situated on the western end of San-men shan.

*Chart 1759.***35 HSIANG-SHAN CHIANG AND SOUTHERN APPROACH.—Coast.**

—**Islets.**—About 1½ miles northward of T'ung-t'ou shan is the south-eastern extremity of a promontory rising to an elevation of 222 feet (67^m7) just within this extremity. Yueh-yu shan is an islet lying close off the northern point of this promontory, and about 6 cables north-eastward of Yueh-yu shan is P'ing-feng shan, an islet 290 feet (88^m4) high. Between Yueh-yu shan and a point situated about 2½ miles north-westward is a bay entirely occupied by a drying mud flat, on which are some islets and rocks.

Chart 1811.

45 Niu-pi-shan shui-tao.—General remarks.—Niu-pi-shan shui-tao (Nu-pi-shan channel) is the southern part of an inshore route which may be taken by vessels, not exceeding 20 feet (6^m1) in draught, proceeding up the coast; it also gives access to Hsiang-shan chiang (Nimrod sound), described on page 302. It is bounded westward by a number of islets and dangers lying off the main coast for about 20 miles northward of Yueh-yu shan, and eastward by Chiu-shan lieh-tao (Kue-shan islands) and Mei-san lieh-tao (Mesan group).

This channel is useful during the winter, when northerly winds

Charts 1199, 2412, 1262, 1263.

Chart 1811.

prevail and typhoons seldom occur. When a typhoon is passing in the offing, and a high easterly swell, its invariable precursor, is setting in upon the coast, vessels exceeding a draught of 16 feet (4^m9) should not use this channel, as the swell occasionally rises 8 feet (2^m4) above the mean level, and there is a depth of only 3½ fathoms (6^m9) in places. 5

Western side of Niu-pi-shan shui-tao.—Coast.—Islands and dangers.

—The coast on the western side of Niu-pi-shan shui-tao is mountainous and rugged, with large cultivated, thickly populated plains between the ranges; the bights in this stretch of coast are encumbered with mud flats, on which are numerous islands, islets and rocks, and there are few places where landing is convenient. There are depths of less than 3 fathoms (5^m5) for about 4 miles off the salient points. The sea in this locality is thickly discoloured by mud and hidden dangers cannot be seen. 16

Tan-men shan (Shang san), 458 feet (139^m6) high, is a hilly island lying about 2½ miles northward of Yueh-yu shan (chart 1759) and about 6 cables offshore, with Dan-men, an islet, 93 feet (28^m3) high, between; two rocks, 37 feet (11^m3) and 20 feet (6^m1) high, lie about half a mile and three-quarters of a mile, respectively, north-north-eastward of the north-eastern point of Tan-men shan (*Lat.* 29° 21' N., *Long.* 121° 58' E.). Ta-mu shan (Budei) lies nearly one mile eastward of Tan-men shan and has a sharp summit, 307 feet (93^m6) high; an islet, 78 feet (23^m8) high, lies close off its western point, and another islet, 116 feet (35^m4) high, named Erh-mu shan, lies close off its eastern point. An islet, 80 feet (24^m4) high, surrounded by foul ground, lies about half a mile northward of Erh-mu shan; two rocks, 42 and 45 feet (12^m8 and 13^m7) high, connected by foul ground, lie, respectively, about 2 and 6 cables eastward of this islet. 20

Wu-kuei shan (Bug-gu), 187 feet (57^m0) high, is the largest of a number of islets in the bight between Tan-men shan and a point on the mainland about 4 miles northward; Yang-luan-tai, (Yan-gi) is an islet, 214 feet (65^m2) high, lying close off this point with a rock, 71 feet (21^m6) high, with other rocks around, lying about 3 cables south-westward of it. Ta-mo shan (Dai-muk), 500 feet (152^m4) high, situated about one mile eastward of Yang-luan-tai, is precipitous and of a dark colour; three rocks lie within half a mile of its north-eastern point, the outer one being 17 feet (5^m2) high. About midway between Ta-mo shan and Yang-luan-tai is a rock 93 feet (28^m3) high. 25

A rock, which dries 6 feet (1^m8), lies about 1½ cables offshore about 1½ miles northward of Yang-luan-tai. 30

Mount Thornton (*Lat.* 29° 27' N., *Long.* 121° 57' E.), 1,467 feet (447^m1) high, is situated about 3½ miles north-westward of Ta-mo shan and about 1½ miles inland. Chueh-ch'i-so-cheng (Jack-ji), situated about one mile northward of Mount Thornton, is a walled town. Yang-pei shan (Mor-ore), 400 feet (121^m9) high, with an islet 158 feet (48^m1) high, close off its eastern side, and foul ground extending about half a mile southward of its south-eastern end, lies about half a mile off the coast eastward of Chueh-ch'i-so-ch'eng. 35

Chiao-mu shan (Ching-ming), 403 feet (122^m8) high, is the largest of a chain of islets which extend about 2½ miles eastward from a point lying about 2 miles north-westward of Yang-pei shan; numerous islets and rocks lie in the bights on either side of this point, and also 40

Charts 1759, 1199, 2412, 1262, 1263.

Chart 1811.

between Yang-pei shan and the chain of islets; for details of all these and of the islets in the chain, the chart should be consulted.

- Tao-jen shan (Yang-i) is an island, 313 feet (95^m4) high, lying on the edge of the mud flat extending from the coast about 2 miles northward of Chiaou-mu shan; foul ground, including rocks from 6 to 45 feet (1^m8 to 13^m7) high, extends about one mile south-eastward from it.

- Dor-yung, 257 feet (78^m3) high, situated about one mile east-north-eastward of Tao-jen shan, and Tao-p'eng shan (Wu-ji), 186 feet (56^m7) high, lying about 2 miles further north-north-eastward, are the principal of numerous islets and rocks which fringe the coast for about 2½ miles northward of Tao-jen shan; the outermost danger is a rock, drying 13 feet (4^m0), situated about one mile east-south-eastward of Tao-p'eng shan.

Chu shan (Needle peak), 1,770 feet (539^m5) high, situated nearly 4 miles westward of Tao-jen shan, is sharp and precipitous; see view on chart 1429.

Charts 1811, 1429.

- Tung-hsü (Nu-pi) shan, 400 feet (121^m9) high, lies with its southern extremity about 1½ miles north-north-eastward of Tao-p'eng shan and about 1½ miles offshore. Its eastern side is precipitous; its western side has one deep indentation which nearly divides the island into two parts. The island is of a light colour, and is partially cultivated. Niu-pi chiao (Buffalo Nose), its north-eastern point, is perforated. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about one mile south-eastward from the island; a rock, 38 feet (11^m6) high, lies on the northern part of this bank and about 4 cables south-eastward of Niu-pi chiao. A rock, 78 feet (23^m8) high, lies about 1½ cables off the north-western point of the island, and a shoal, with a depth of 2 fathoms (3^m7) over it, extends about 2 cables from the western side of the rock.

- Hsi-hsü shan (Ploughman), an islet 388 feet (118^m3) high, situated nearly one mile westward of the north-western point of Tung-hsü shan, is rocky, precipitous, covered with grass, and has a flat summit; a rock, which dries 3 feet (0^m9), lies 2 cables off its south-western side. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about one mile north-westward from Hsi-hsü shan, and Lei-ku shan (Lok yü), 148 feet (45^m1) high, and another islet lie on the western edge of this bank. A prominent rock, 6 feet (1^m8) high, lies about half a mile eastward of the northern point of Lei-ku shan. A rock, which dries 13 feet (4^m0), lies about 4 cables off the coast of the mainland south-westward of Lei-ku shan. O-t'ou-chung (Tunic island), 170 feet (51^m8) high, lies close off the main coast and nearly 1½ miles westward of Lei-ku shan.

- Caution.**—In 1934, depths of fully one fathom (1^m8) less than those charted were found in the northern part of Niu-pi-shan shui-tao between a position about 3 miles north-eastward of Tung-hsü shan and a position about the same distance north-westward of this island.

Chart 1811.

Lights.—A light is exhibited, at an elevation of 95 feet (29^m0), from a black octagonal brick tower on Chi-niang chiao, an islet situated about half a mile southward of Tao-p'eng shan.

A light is occasionally exhibited at an elevation of 56 feet (17^m1),

Charts 1759, 1199, 2412, 1262, 1263.

Chart 1811.

from a stone tower on an islet, 46 feet (14^m0) high, lying about half a mile northward of Tao-p'eng shan (*Lat.* 29° 35' N., *Long.* 122° 00' E.).

Eastern side of Niu-pi-shan shui-tao.—Islands and dangers.—
Anchorage.—Chiu-shan lieh-tao or Kue-shan islands are a group of 5 islands, islets, and rocks lying on the eastern side of the southern entrance to Niu-pi-shan shui-tao. *See* view facing page 306. Chi-ku shan (Ki-lung yü), situated about 11 miles eastward of Ta-mo shan, is the south-eastern and most remarkable island of the group; it is precipitous on its southern and eastern sides, and has a well defined 10 summit 503 feet (153^m3) high. A rock lies close off its south-eastern side, with a deep, narrow cleft between, in which is a sharp pinnacle about 15 feet (4^m6) high; Chiang-chun-mao, a rock 105 feet (32^m0) high, lies about a quarter of a mile off the eastern side of the island, and the passage between is foul. An islet, 57 feet (17^m4) high, lies 15 about a quarter of a mile north-westward of Chi-ku shan. Ma-pu shan (Twist islet), 134 feet (40^m8) high, lies nearly 1½ miles westward of Chi-ku shan; Hsia-ma-teng, 140 feet (42^m7) high, lies about three-quarters of a mile north-eastward of Ma-pu shan, and two other islets lie close together off its western side; the western islet is 20 126 feet (38^m4) high.

Wen-ch'ung shan (Dai-ching) lies about 3 miles west-north-westward of Chi-ku shan, and a rock, which dries 13 feet (4^m0), lies about a quarter of a mile off its southern side; Pai chiao (Oliver rocks) consists of two rocks awash, the south-western of which lies 25 about 6 cables southward of the south-western point of Wen-ch'ung shan. Hei chiao (Holderness rocks) consists of two rocky heads, close together, with a depth of less than 6 feet (1^m8) over them, lying about 6 cables westward of Wen-ch'ung shan.

Nanchiu shan (Dai-wan), the largest island of the group, is separated 30 from Wen-ch'ung shan by a narrow passage with a depth of 7 fathoms (12^m8); its highest peak, in the western part of the island, is 511 feet (155^m7) high. The principal village is situated near a narrow isthmus in the middle of the island. A bank, with a depth of less than 3 fathoms (5^m5) over it, on which there are numerous fishing 35 stakes, extends fully one mile from the north-western side of the island. Fishing stakes were observed, in 1939, extending about 4 cables westward from an islet, 110 feet (33^m5) high, situated close off the western end of Nanchiu shan. An islet, 159 feet (48^m5) high, lies close off the north-eastern end of Nanchiu shan. 40

Kuan-ch'uan-ao (Kun-su-wan), 334 feet (101^m8) high, the north-western island of the group, lies about one mile north-westward of Nanchiu shan, with Zong-mung, 197 feet (60^m0) high, between; it is connected at low water to Observatory Hill, an islet, 78 feet (23^m8) high, close off its south-eastern side. Foul ground extends nearly 45 half a mile eastward from Zong-mung, and there are rocks in mid-channel between Zong-mung and Observatory Hill. Foul ground extends about half a mile offshore on the eastern side of Kuan-ch'uan-ao. There is good anchorage for vessels with local knowledge, in a depth of 5 fathoms (9^m1), mud, about 2 cables offshore, with 50 Observatory Hill bearing 077° and just open southward of the southern point of Kuan-ch'uan-ao, and the summit of this island bearing 357°; this anchorage is sheltered from winds from between north-north-west and south, through north and east.

Charts 1759, 1199, 2412, 1262, 1263.

Chart 1811.

Chit-kuk (*Lat.* 29° 27' N., *Long.* 122° 15' E.), lies about 3 miles eastward of Kuan-ch'uan-ao, and is the south-eastern islet of a chain of islets and rocks extending eastward from that island. Chit-kuk 5 has a sharp summit, 282 feet (85^m9) high, and is a useful landmark for vessels passing eastward of the group. The following islets, from 45 to 220 feet (13^m7 to 67^m1) high, are included in the chain:—Nu-yan, Wong-zor, Li-jong, Jong-jong, I-jong, Ming-zong, and Chung-jong-mu.

- 10 Shu shan, situated about 6 miles north-north-westward of Chit-kuk, is a black rock 14 feet (4^m3) high; a rock, which dries 8 feet (2^m4), lies about 2 cables north-westward of Shu shan.

Charts 1811, 1429.

- Ta-chien-ts'ang (Mesan), 511 feet (155^m7) high, the largest and 15 highest of Mei-san lieh-tao or Mesan group, lies nearly 5 miles north-westward of Shu shan and is of a light colour, being covered with grass; it is precipitous on its eastern side and has a sharp summit. A ridge of rocks extends about a quarter of a mile from the southern side of the island, and a bank, with depths of less than 3 fathoms 20 (5^m5) over it, extends fully half a mile from the north-western side of the island. An island, 196 feet (59^m7) high, with a rock, 109 feet (33^m2) high, off its northern side, lies about half a mile south-eastward of Ta-chien-ts'ang, with another island, 136 feet (41^m4) high, close eastward of it. 5-fathom (9^m1) patches lie close northward of these 25 islands, and also westward and south-westward of the western island. An islet, 45 feet (13^m7) high, lies off the north-eastern side of Ta-chien-ts'ang.

- Hsieh-hsüan-t'ou (Tinker) is a black, rugged islet lying about half a mile southward of the western point of Ta-chien-ts'ang; a pinnacle 30 rock, with a depth of one foot (0^m3), over which the sea seldom breaks, lies about half a mile east-south-eastward of Hsieh-hsüan-t'ou. A bank, with a depth of 5 fathoms (9^m1) over it, lies about 1½ miles south-eastward of Hsieh-hsüan-t'ou. In 1933, fishing stakes were found to extend from the south-eastern islet of Mei-san lieh-tao to 35 Ta-wen-ch'ung (Mun-dun-san), situated about 2½ miles north-eastward. Ts'ai-tzu shan (Lanyett) which has a conspicuous cave on its eastern side, lies about half a mile north-north-westward of Ta-chien-ts'ang, with islands, 320 and 105 feet (97^m5 and 32^m0) high, respectively, situated about a quarter of a mile westward and north- 40 eastward of it; a bank, with depths of less than 3 fathoms (5^m5) over it, extends nearly 1½ miles north-westward from these islands, and there are several rocks above water on it.

- Liu-heng tao (Lu-wang), one of the large islands of Chou-shan chün-tao (Chusan archipelago) (page 306) lies northward of, and is 45 separated from Mei-san lieh-tao by a channel about one mile wide. Castle rock, 49 feet (14^m9) high, lies in the eastern part of this channel and about 1½ miles eastward of Ts'ai-tzu shan; a rock, with a depth of 6 feet (1^m8) over it, lies in the north-western part of the channel and about 2½ miles north-westward of Ts'ai-tzu shan. 50 Ta-wen-ch'ung and the other islands off the south-eastern end of Liu-heng tao are described on page 307.

A ridge of hills, covered with stunted gum trees and patches of cultivation, traverses the middle of Liu-heng tao, and branches off at the north-western end to form three capes; T'ien-wan shan (Helby

Charts 1759, 1199, 2412, 1262, 1263.

Charts 1811, 1429.

peaks), 982 feet (299^{m3}) high, situated in about the middle of the north-western end, is the highest point on the island. A hill at the south-eastern end of the island, 902 feet (274^{m9}) high, is prominent. See view on chart 1429. The plains are cultivated and irrigated. 5

The south-western coast of Liu-heng tao is rugged and indented by several bays, which are, however, almost completely occupied by mud flats which dry. K'uo ch'ü shan (Flake island), 135 feet (41^{m1}) high, lies about one mile east-south-eastward of Clarence point, the south-western point of Liu-heng tao; a spit with general depths of 10 less than 3 fathoms (5^{m5}) over it, extends about 3 miles south-eastward from K'uo-ch'ü shan, and near its south-eastern end are Hsiao-ch'ing shan and Ta-ch'ing shan (Reef islands), 178 and 196 feet (54^{m2} and 59^{m7}) high, respectively, which are connected to each other at low water. Heavy fishing stakes were reported, in 1934, 15 to extend nearly 2 miles south-south-westward from a position about three-quarters of a mile southward of K'uo-ch'ü shan; in 1937 numerous fishing stakes and floats were observed in mid-channel between Ta-ch'ing shan and Tung-hsü shan (page 298).

Chart 1429.

Duffield rocks are a line of black rocks extending about 6 cables south-westward from Clarence point, and terminate in a rock which dries 4 feet (1^{m2}); the highest of these rocks is 53 feet (16^{m2}) high. The western coast of Liu-heng tao, with the off-lying islands is described with Shuang-hsü Chiang (Duffield pass) on page 320. 20 25

Chart 1811.

Dangers in Niu-pi-shan shui-tao.—Pylades rock, situated nearly 3½ miles north-eastward of Ta-mo shan (page 297) and on the western side of the fairway through Niu-pi-shan shui-tao, is awash; unless there is a heavy swell the sea only breaks on this rock at low water. 30

Sizor (Whelps) consists of four rocky islets, in groups of two, lying about 3½ miles north-north eastward of Pylades rock, and on the western side of the fairway. The southernmost and highest islet is 90 feet (27^{m4}) high, and eastern of the northern group is 82 feet (25^{m0}) high. 35

Corkers, situated on the western side of the fairway, consist of islets and rocks, lying from 2 to 4½ miles north-north-westward of Sizor. Hong-yan-zor, the south-western islet, lies about 3½ miles north-westward of Sizor, and has precipitous sides; two rocks above water lie off its south-eastern point. The south-eastern islet, situated 40 nearly 1½ miles eastward of Hong-yan-zor, is 52 feet (15^{m8}) high, and a rock, 23 feet (7^{m0}) high, lies about half a mile north-westward of it. Two rocks, with a least depth of 5 feet (1^{m5}) over them, lie about 6 cables southward of the south-eastern islet. The eastern end of the northern group, which includes islets and rocks from 9 to 54 feet 45 (2^{m7} to 16^{m5}) high, lies about 1½ miles northward of the south-eastern islet. For further details the chart should be consulted.

Starboard Jack, situated on the eastern side of the fairway and about 3½ miles east-north-eastward of the south-eastern Corker, is a rugged black rock 30 feet (9^{m1}) high. A rock, which dries 6 feet 50 (1^{m8}), lies 2 cables eastward of Starboard Jack, and a rock, 2 feet (0^{m6}) high, lies about one cable northward of it.

Fishing stakes are usually to be found in large numbers in Niu-pi-shan shui-tao.

Charts 1759, 1199, 2412, 1262, 1263.

Chart 1429.

Anchorage.—Good anchorage can be obtained southward of K'uo-ch'ü shan (*Lat.* 29° 42' N., *Long.*, 122° 04' E.) and westward of Ta-ch'ing shan, in depths of from 5 to 7 fathoms (9^m1 to 12^m8),
 5 sheltered from winds from between north-west and east-south-east, through north and east. In fine weather there is good anchorage anywhere between Liu-heng tao and the entrance to Hsiang-shan chiang.

Charts, 1811, 1429

10 **Tidal streams.**—The tidal streams in the vicinity of Chiu-shan lieh-tao are rotatory clockwise, and, so far as the conformation of the islands will allow, run thus:—From 4 hours before high water at Yangtze approaches (Admiralty Tide Tables Standard Port) to one hour before, the stream sets between west and north; from one
 15 before to 2 hours after high water, between north and east; from 2 to 5 hours after high water, between east and south; and from 5 hours after high water to 4 hours before the next high water, between south and east. The maximum rate is from one to 3 knots, according to the age of the moon.

20 Between a position about 10 miles eastward of Chiu-shan lieh-tao and Tung-t'ing tao (Tongting) (chart 1199), situated about 30 miles north-eastward, the tidal streams are as follows:—4 hours before high water at Yangtze approaches the tidal stream is setting southward; it then changes through south-west to westward; 2 hours
 25 after high water at Yangtze approaches the tidal stream is setting north-westward; it then changes through north and east to southward. The rate is from a half to 2½ knots.

Chart 1429.

The tidal streams at the anchorage southward of K'uo-ch'ü shan
 30 set north-westward from 4½ hours before until 1½ hours after high water at Yangtze approaches, and south-eastward from 1½ hours after high water until 4½ hours before the next high water. The rate is from one to 3 knots, according to the age of the moon.

Chart 1583.

35 **Hsiang-shan chiang.**—**General remarks.**—Hsiang-shan chiang (Nimrod sound) is entered between Chiao shan (Hunter point), situated about 2½ miles westward of O't'ou-ching (page 298), and Huang-nui chiao (Sail rock), lying about 4 miles north-westward. The sound extends for about 25 miles south-westward from the entrance, and
 40 the inner half is encumbered with islands.

Charts 1811, 1583.

Entrance to Hsiang-shan chiang.—**Islets and dangers.**—**Beacon.**—

Anchorage.—Chumung islets, with a number of rocks, lie off Chiao shan; Yeh-lung shan, the easternmost islet, situated about one mile
 45 north-eastward of Chiao shan, is the highest and most prominent of the group, and is of a light colour, precipitous on the eastern side, and has a well defined summit 195 feet (59^m4) high on which is a triangular framework beacon. Ch'i chiao (Pearl rock), the northernmost rock in this vicinity, lies about 1½ miles northward of Chiao shan and is 18
 50 feet (5^m5) high.

Anchorage can be obtained in depths of from 3½ to 4½ fathoms (6^m4 to 8^m2), with Chiao shan bearing 080°, distant from one to 2 miles.

Huang-nui chiao lies on the drying flat extending from the northern

Charts 1759, 1199, 2412, 1262, 1263.

Charts 1811, 1583.

side of the entrance and is a vertical square rock 24 feet (7^m3) high. The entrance to Ta-sung chiang (kiang) lies about 1½ miles south-westward of Huang-nui chiao.

In 1934 fishing stakes were found to extend across the entrance to Hsiang-shan chiang between Chumung islets and the mouth of Ta-sung chiang. 5

**Outer part of Hsiang-shan chiang.—Islands and dangers.—Anchor-
age.**—The outer half of Hsiang-shan chiang, for a distance of about 11 miles within the entrance, is almost entirely free from dangers, 10 and is nowhere less than 1½ miles wide.

Chart 1583.

Cone point is situated on the southern shore and about 4 miles west-south-westward of Chiao shan. Wan chiao (Cone rock) (*Lat.* 29° 38' N., *Long.* 121° 50' E.), 18 feet (5^m5) high, lies about 6 cables 15 northward of Cone point, and Mao chiao (David islet) lies about half a mile westward of this point. A rock, with a depth of one fathom (1^m8) over it, lies about 2 cables north-north-eastward of Mao chiao, and a rock, with a depth of 2½ fathoms (4^m1) over it, lies about one mile westward of this islet. Hou-hua shan (Nimrod point), situated 20 about 1½ miles west-south-westward of Mao chiao, has a hill on it 305 feet (93^m0) high. Dragon point is situated about 3½ miles south-westward of Hou-hua shan, with Boat point, Rock point, and Fisherman point, between. Wu-kuei shan (Middle island), about 40 feet (12^m2) high, lies in mid-channel about one mile northward of 25 Dragon point. Barren point is situated on the northern shore, about 6 miles south-westward of Huang-nui chiao and Ch'i-pan shan (Barren islet), lies about half a mile north eastward of the point. Li shan (Nimrod islands) consisting of two islands 150 and 240 feet (45^m7 and 73^m1) high, respectively, lie close off the coast about 2 miles 30 south-westward of Barren point; a bank, with depths of less than 3 fathoms (5^m5) over it, extends from the coast within the line joining the northern island of Li shan and Barren point. Tasong point is situated about 2½ miles south-westward of the southern island 35 of Li shan.

Round point is situated on the southern shore about three-quarters of a mile southward of Dragon point, and the entrance to Kao-ni chiang (Medusa creek) lies between this point and Medusa point, about 6 cables westward. This creek runs eastward for about 2 miles, and its channel is deep; it then opens out into a basin, which is, 40 however, mostly occupied by shoal flats. There is a landing place on the northern shore, about 1½ miles eastward of Round point. Anchorage can be obtained, in a depth of about 10 fathoms (18^m3), about 3 cables southward of the landing place.

**Inner part of Hsiang-shan chiang.—Islands and dangers.—An-
chorages.**—Kang-p'ai shan (Parker Island), 627 feet (191^m1) high, 45 lies with its eastern extremity about one mile south-westward of Tasong point, and is separated from the northern shore of the sound by a narrow channel, which is used by small coasting steamers. A rock, which dries, lies about 4 cables eastward of the eastern point of the 50 island, and a similar rock lies about 3½ cables south-eastward of the same point. Entrance island, 187 feet (57^m0) high, lies about half a mile south-westward of Kang-p'ai shan; an islet lies about a quarter of a mile westward of Entrance island, and in 1933, fishing stakes

Charts 1429, 1199, 2412, 1262, 1263.

Chart 1583.

were found to extend across the channel up to a distance of nearly one mile southward of this islet. The channel southward of Kang-p'ai shan and Entrance island is deep. Morris island, 335 feet (102^m1) high, lies close off the northern shore about 2 miles westward of Entrance island, with several small islets and rocks between. Sheltered anchorage can be obtained about 4 cables east-south-eastward of Morris island, in a depth of 5 fathoms (9^m1).

Adam point (*Lat.* 29° 31' N., *Long.* 121° 40' E.) lies on the southern shore about 3 miles west-south-westward of Medusa point, with Richard point between; a 3-fathom (5^m5) patch lies about half a mile westward of Adam point.

Pa-za islands are a chain of six islands extending about 2½ miles south-westward from a position about 3 miles westward of Adam point; the easternmost island is 249 feet (75^m9) high, and is called Pai-shih shan; the western islet is called Tung-ja. In 1934, H.M.S. *Bridgewater* anchored between Entrance island and Deepwater point, the northern point of Pai-shih shan; this anchorage is entirely landlocked, and is recommended as affording good shelter in a typhoon. There is good anchorage for small vessels with local knowledge in the basin southward of Pa-za islands, in a depth of about 5 fathoms (9^m1), out of the strength of the tidal streams; between Pai-shih shan and the shore south-eastward, there are depths of not more than 3 fathoms (5^m5). Bight point is situated on the southern shore about 6 miles west-south-westward of Adam point. Eel islet, 75 feet (22^m9) high, and surrounded by shoals, lies about three-quarters of a mile north-westward of Tung-ja, with a 2½-fathom (5^m0) patch about 6 cables north-eastward of it; there is anchorage, with good holding ground, northward of this islet, in depths of from 4½ to 6½ fathoms (8^m2 to 11^m9).

On the northern shore between Morris island and Hewett point, situated about 5½ miles west-south-westward, the coast recedes and forms a bight filled with drying flats. Hsüan shan (Harlequin island) and another island northward of it lie on the flats in the middle of this bight, Hsüan shan lying with its south-eastern point about three-quarters of a mile north-westward of Deepwater point; a half-tide rock lies about 3 cables eastward of the south-eastern point of Hsüan shan, and between this rock and Deepwater point there are depths of 3½ and 4 fathoms (6^m4 and 7^m3). A narrow channel runs through the flats between Hsüan shan and the northern shore. Tong-ju village lies on the shore of the bight westward of Hsüan shan.

Pisani shoal, with a depth of 1½ fathoms (2^m7) over it, and Midway reef, which dries, lie, respectively, about 1½ miles east-south-eastward and half a mile south-south-eastward of Hewett point.

The head of Hsiang-shan chiang, between Hewett point (*Lat.* 29° 30' N., *Long.* 121° 31' E.) and Bight point, is divided into two parts by a tongue of land, of which Hastings point is the northern extremity. Schiatu point lies about 1½ miles south-eastward of Hastings point. Shoal flats extend from the northern end of the tongue of land as far as Tung-ja, and on them are a number of islands and rocks, including New, Round, Fern and Tree islands, and a group called Twins.

Wang-tun chiang (Ninghai creek), situated on the eastern side of this tongue of land, has a narrow channel between the flats on either

Chart 1583.

side; Flat island, situated about one mile east-north-eastward of Schiatu point, lies in the centre of the entrance to this channel. Su-su-ku bay, entered between Hewett point and Hastings point, is an extensive basin greatly occupied by flats; Simpson point lies about $2\frac{1}{2}$ miles west-north-westward of Hewett point. Sisters and Brothers are groups of rocks in Su-su-ku bay, situated, respectively, about one mile north-north-eastward and $2\frac{1}{2}$ miles south-south-westward of Simpson point. 5

Tidal streams.—The in-going tidal stream runs into Hsiang-shan 10
chiang from three quarters of an hour before low water until three
quarters of an hour before high water at Yangtze approaches
(Admiralty Tide Tables Standard Port), and the out-going stream
runs from three quarters of an hour before high water until three
quarters of an hour before low water. At spring tides the maximum 15
rate of the tidal streams at the entrance is 3 knots; at the anchorage
northward of Eel islet the maximum rate is 4 knots, and the tidal
streams are also strong in the channel southward of Kang-p'i shan.

Charts 1199, 2412, 1262, 1263.

CHAPTER VI.

CHOU-SHAN CH'ÜN-TAO AND SOUTHERN APPROACHES TO CH'ANG
CHIANG. YUNG CHIANG AND HANG-CHOU WAN.*Charts 1429, 1124.*

CHOU-SHAN CH'ÜN-TAO.—**General remarks.**—Chou-shan ch'ün-tao (Chusan archipelago) extends for about 35 miles northward of Liu-heng tao (page 300), and includes that island. The islands are
 5 bold and rugged; the summits of the hills are often sharp and well defined, whilst their slopes are sterile and are covered with slabs of rock and loose boulders interspersed with grass. There are small patches of cultivation in the valleys and sheltered corners, and in the larger islands, such as Chou shan (Chusan), there are richly cultivated
 10 plains and many densely populated towns. The coasts of the islands are rocky, generally faced with cliffs, and there are off-lying pinnacles, most of which are above water.

As a rule, the sea does not run high amongst the islands, but the day before the approach of a typhoon, and during its continuance,
 15 there is a heavy swell. The sea is impregnated with mud, being especially thick towards the last of the ebb or east-going stream, and sunken dangers cannot be seen. Pinnacle rocks can only be detected by the rippling of the tide, but often there is no indication of their existence.

20 Fog is not uncommon from March to July inclusive. No attempt should be made to proceed amongst these islands during fog; owing to the strong tidal streams a vessel touching the ground may at once heel over.

The archipelago may conveniently be divided into two main
 25 groups. The southern group consists of Chou shan (*Lat. 30° 05' N., Long. 122° 10' E.*), the largest island of the archipelago, and all islands further southward; the northern group includes, generally, all islands northward of Chou shan. The southern group is described first, and is followed by the description of the passage between this
 30 group and the mainland. The northern group is described on page 334.
Chart 1199.

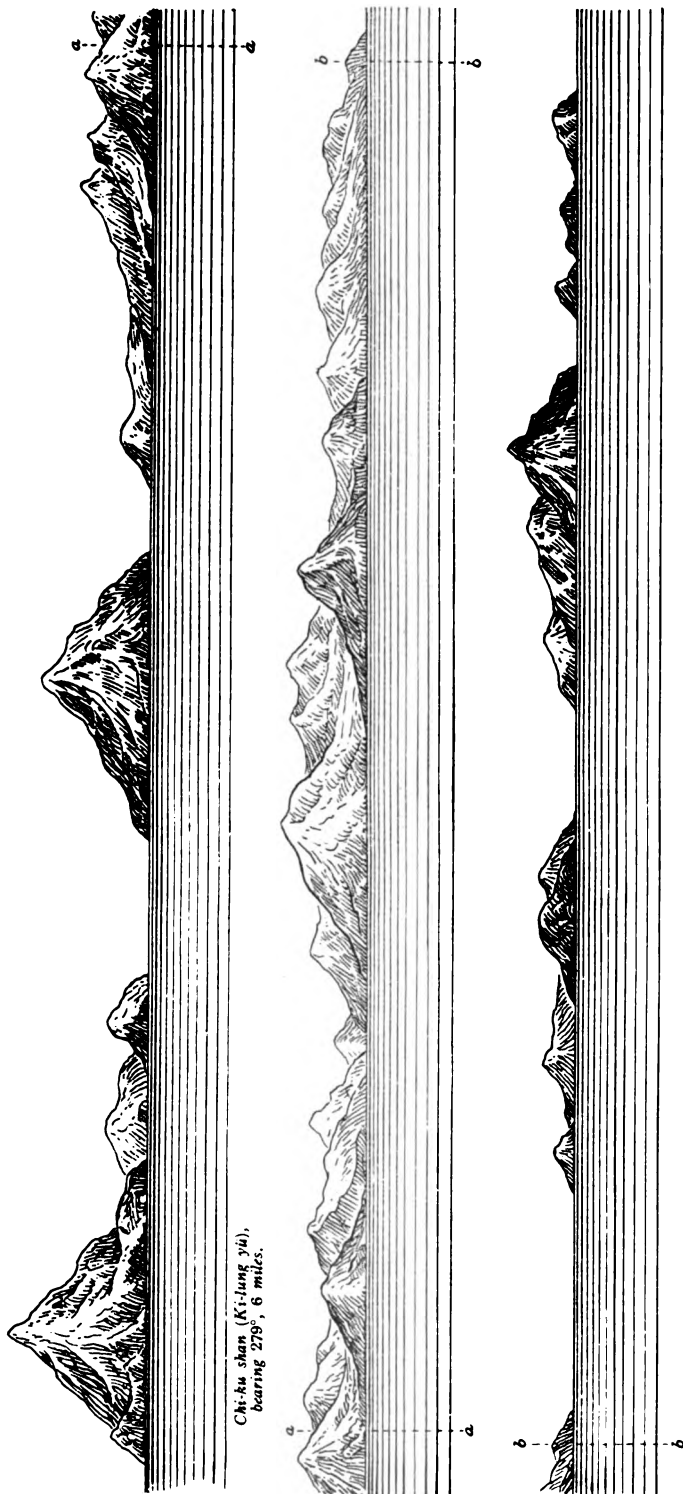
Out-lying danger.—The *Koan Maru* reported, in 1910, that breakers were seen in *Lat. 29° 43' N., Long. 123° 09' E.*; the position is doubtful.

35 *Charts 1429, 1124.*

Tidal streams.—The tidal streams around and between the islands are very rapid, sometimes attaining a rate of 8 knots, and the numerous tide-rips are dangerous for boats when there is much wind.

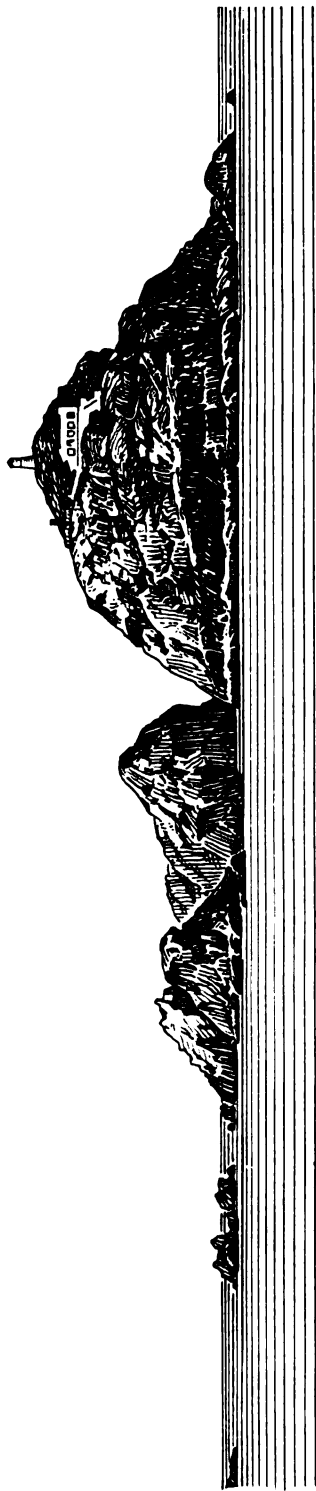
Charts 2412, 1262, 1263.

To face page 306.



View, in three parts, of Chiu-shan lieh-tao (Kue-shan islands) from eastward.
(Original dated 1844).

To face page 397.



Tung-t'ing tao (Tongting) from southward.
(Original dated 1932).

Charts 1429, 1124.

The direction of the tidal streams eastward of Ch'ang-t'u shan (page 338), at the northern end of the archipelago, is rotatory, turning with the hands of a clock, but in the passages between the islands, in the entrance to Hang-chou wan (Hangchow bay), and close to the 5 mainland, the streams follow the general contour of the coast.

When clear of local influences, the following is a broad guide :— From 6 to 4 hours before high water at Yangtze approaches (Admiralty Tide Tables Standard Port) the tidal stream sets between south and west; from 4 hours before until high water, between west and north; 10 from high water to 3 hours after, between north and east; and from 3 to 6 hours after high water between east and south.

Chart 1429.

SOUTHERN GROUP OF CHOU-SHAN CH'ÜN-TAO.—General remarks.—The southern group of Chou-shan ch'ün-tao consists of 15 Chou shan and its adjacent islands, and a chain of islands between Lui-heng tao and the south-eastern end of Chou shan, which lies about 14 miles north-eastward. The islands on the western side of Chou shan are described with the inshore passage westward of Chou-shan ch'ün-tao on page 318. The islands off the western end of the 20 southern side of Chou shan are described with Ting-hai chiang (harbour) and its approaches on page 327.

Islands and dangers eastward of Liu-heng tao.—Anchorage.—Ta-wen-ch'ung (Mun-dun-san), 338 feet (103^m0) high and the southernmost island of Chou-shan ch'ün-tao, lies about 1½ miles south-eastward of Lao-ying tsui, the south-eastern point of Liu-heng tao. Between Ta-wen-ch'ung (*Lat.* 29° 38' N., *Long.* 122° 13' E.) and Mo-ta tao (tau), a large island situated about 3 miles northward, are Hsiao-wen-ch'ung (Bustle island), 293 feet (89^m3) high; Improver islet, 125 feet (38^m1) high; Shan-shuang shan (Dickey islets), 30 consisting of two islets, 102 and 125 feet (31^m1 and 38^m1) high, respectively; Pi-chia shan (Bang island), 364 feet (110^m9) high; Fu-t'ou shan (Cuff island), 200 feet (61^m0) high; Yen-wa shan (Long-dun-san), 286 feet (87^m2) high; and Tui-mien shan (Dur-ming-san), 381 feet (117^m1) high; as well as several islets and rocks. Slab rock, 35 43 feet (13^m1) high, lies off the south-eastern end of Pi-chia shan. Port Rouse, situated between these islands and the eastern end of Liu-heng tao is a convenient place of vessels proceeding through T'iao-chou men (Beak Head channel), described on page 308, to await 40 favourable tidal streams.

Mo-ta tao, 521 feet (158^m8) high, is separated from Yen-wa shan, Tui-mien shan, and the north-eastern coast of Liu-heng tao by Hai-shih men (Perth passage), a narrow channel with a least depth of 3¼ fathoms (5^m9) in the fairway, although the depths are considerably more in the greater part of it. Kor-dun, about 300 feet (91^m4) high, 45 is a point on the coast of Liu-heng tao at the western entrance to Hai-shih men. T'iao-chou t'ou (Beak head) the eastern extremity of Mo-ta tao, is a peninsula, 484 feet (147^m5) high, joined to the main part of the island by a long, narrow isthmus. Two rocks, one of them 34 feet (10^m4) high and called Shuang-luan, lie within a distance of 2 50 cables from the southern extremity of the peninsula, and Beak reef, with three islets on it, from 50 to 149 feet (15^m2 to 45^m4) high, extends nearly three-quarters of a mile from its eastern side. Two

Charts 1199, 2412, 1262, 1263.

Chart 1429.

reefs, awash at high water, lie about 3 cables off the northern side of the main part of Mo-ta tao. Hou-men shan (Gull island), 235 feet (71^m6) high, Ta-liang-t'ou (Ho-mun), 260 feet (79^m2) high, and 5 Hsiao-liang-t'ou (Lung-dun), 172 feet (52^m4) high, lie off the northern coast of Mo-ta tao.

T'iao-chou men.—Islands and dangers.—Directions.—Anchorage.—

T'iao-chou men or Taosao mun (Beak Head channel) is bounded on its southern side by Mo-ta tao and the north-eastern coast of Liu 10 heng tao, and on its northern side by Hsia-chih tao (Ho-ji), a large island 678 feet (206^m6) high, and the islands and reefs north-westward of it. Pa-men tsui (Vernon point), the south-eastern point of Hsia-chih tao, lies about 3 miles north-north-eastward of T'iao-chou t'ou; close within the point is a rugged hill, 612 feet (186^m5) high, strewn 15 with large granite boulders. Kinheang and Sedley points are situated on the southern coast of Hsia-chih tao, about one mile and 2½ miles, respectively, westward of Pa-men tsui (*Lat.* 29° 44' N., *Long.* 122° 18' E.).

Tsou-ma-t'ang (Chu-mor-dong), an island 457 feet (139^m3) high, 20 lies between Ta-liang-t'ou and the south-western coast of Hsia-chih tao; an islet, about 80 feet (24^m4) high, lies close off its south-eastern point, and another islet, 102 feet (31^m1) high, lies close off its western end. T'iao-chou men runs between Ta-liang-t'ou and Tsou-ma-t'ang, and its width here is narrowed to about 4 cables by Mogs 25 reef, which lies between Ta-liang-t'ou and Hou-men shan; a rock on the northern part of this reef is 9 feet (2^m7) high. Hobart channel, which is entered between Tsou-ma-t'ang and Hsia-chih tao, leads north-westward past Westphal point, the north-western extremity of Hsia-chih tao, into Shih-p'eng Chiang (Vernon channel), which is 30 described on page 309. This channel is intricate, and should not be used without local knowledge. It is encumbered with numerous islets and rock, for the positions and heights of which the chart should be consulted; among these are Kennedy rock, Ch'ang shan (MacPherson islet), Chu-chia shan (Annie islet), Ta-kua shan (Butler 35 islet), Love and Samuel islets, Rees islets, Webster islets, Fysh rock, and Ma-an shan (Percy islet).

A reef extends about 3 cables north-westward from the western point of Hsiao-liang-t'ou, and just within its outer edge is Jin-mo-dun, a rock which dries 13 feet (4^m0). Liang-mao shan (Ma-mau-chea) 40 and Li-mau-chea are two islets lying on the drying mud flat extending from the north-eastern coast of Liu-heng tao and about one mile and 1½ miles, respectively, westward of Jin-mo-dun; two 3-fathom (5^m5) patches are situated between Liang-mao shan and Jin-mo-dun. Huang chiao (Yuen), a rock 10 feet (3^m0) high, lies nearly 1½ miles 45 north-westward of Li-mau-chea.

Chin-po hsü (Fo-jia), 378 feet (115^m2) high, is an island on the northern side of T'iao-chou men, and lies about 1½ miles north-westward of Tsou-ma-t'ang; Dot islet, 30 feet (9^m1) high, lies about 3 cables south-eastward of the eastern point of Chin-po hsü. Ch'ing-ping shan (Nunpi), 71 feet (21^m6) high; Man-t'ou shan (Steer islet), 132 feet (40^m2) high; Shuan-luan shan (Tsu), 46 feet (14^m0) high; 50 Wai-chiao-pei (Forbes islet), 112 feet (34^m1) high; and Ta-men shan (Pai rock), 114 feet (34^m7) high, which lies nearly 3 miles north-westward of Chin-po hsü, form the north-eastern side of the channel;

Charts 1199, 2412, 1262, 1263.

Chart 1429.

north-eastward of these islets are Hu-ni shan (Ho-a-bung) and Hsi-pai-lien shan (Si-pa-ling), two larger islands, 282 and 392 feet (85^m9 and 119^m5) high, respectively, lying close together; Li-chiao-pei (Stone islet), 94 feet (28^m7) high, lies off the western end of Hu-ni shan. 5

Fu-jen hsü (Rugged rock) (*Lat.* 29° 46' N., *Long.* 122° 08' E.), lying on the south-western side of the channel and about 1½ miles north-north-westward of Huang chiao, is 91 feet (27^m7) high and is surrounded by foul ground. Bangor point is on the coast of Liu-heng tao about three-quarters of a mile north-westward of Fu-jen hsü, 10 and Tung-lang tsui (Cape Luwang), the northern extremity of Liu-heng tao, is about one mile north-north-westward of Bangor point.

The fairway of T'iao-chou men is deep throughout. Vessels proceeding through this channel from eastward should steer to pass southward of Tsou-ma-t'ang and Chin-po hsü, and thence midway 15 between Tung-lang tsui and Ta-men shan; if the north-west-going tidal stream is running, vessels should guard against being set towards Ta-men shan. Good anchorage can be obtained, in a depth of 10 fathoms (18^m3), north-westward of Chin-po hsü.

Shih-p'eng chiang.—Islands and dangers.—Shih-p'eng chiang 20 (Vernon channel) lies between Hsia-chih tao and T'ao-hua tao (Tau-hwa) and is entered from eastward between Symonds point, situated about three-quarters of a mile northward of Pa-men tsui, and Agnew point, the south-eastern point of T'ao-hua tao, situated about 2½ miles north-north-eastward. T'ao-hua tao is a bold, precipitous island, 25 1,792 feet (546^m2) high; near its north-western extremity is a peculiar vertical crag, 873 feet (266^m1) high.

Immediately southward of Symonds point is the entrance to a narrow cove, which penetrates the island for about three-quarters of a mile in a westerly direction and affords shelter for boats. Sudbury 30 point, situated about 3 miles west-north-westward of Symonds point, is the north-western entrance point to a shallow bay in the middle of the north-eastern side of Hsia-chih tao; Shuang-luan shan (Double islet), 67 feet (20^m4) high, and Pan-pien shan (Prince islet), 83 feet (25^m3) high, lie near the eastern end of this bay. 35

About 4½ miles within the entrance Shih-p'eng chiang is divided into two passages by Hsiao-shuang shan (Si-a-sor) and Ta-shuang shan (Jan-pai), two islands, 100 and 483 feet (30^m5 and 147^m2) high, respectively, lying close together and connected by a ridge with depths of less than 3 fathoms (5^m5) over it; both these passages are deep. 40 The passage southward of Ta-shuang shan is bounded southward by Lyne rock, which dries 2 feet (0^m6), Saban, a rock one foot (0^m9) high, and the islets Tzu-ts'ai shan (Tsu-tsi) and Tung-pan shan (Tung-pau), 224 and 103 feet (68^m3 and 31^m4) high, respectively. The channel northward of Ta-shuang shan is about 4 cables wide between a rock, 45 which dries 7 feet (2^m1), lying about half a cable off the northern coast of this island, and Scott islets, which lie close off the south-western coast of T'ao-hua tao, and include Hsiao-lan shan (Cazenove islet), 42 feet (12^m8) high, and Shang-lan shan (Beresford islet), 38 feet (11^m6) high. 50

The north-western entrance to Shih-p'eng chiang is divided into three channels by Tung-pai-lien shan (Lu-mo-yung), 338 feet (103^m2) high, and by Barnes islets, a group including Kynaston islet (*Lat.* 29° 49' N., *Long.* 122° 12' E.), 50 feet (15^m2) high; Do-pa-ling,

Chart 1429.

153 feet (46^m3) high; and Do-a-bung, 193 feet (58^m8) high. All three channels are deep. Bounty islets, the outermost 60 feet (18^m3) high, extend over a quarter of a mile off the eastern side of
 5 Tung-pai-lien shan, and Lao-shu shan (Eggerdon islet), 200 feet (61^m0) high, lies 2 cables off the southern side of the same island.

Anchorage.—Tidal streams.—The large bay on the north-eastern side of Hsia-chih tao, in which are a few islets and reefs, affords anchorage in a depth of about 4 fathoms (7^m3). Anchorage can also
 10 be obtained off the southern side of Ta-shuang shan.

The tidal streams in Shih-p'eng Chiang set north-westward from 4½ hours before until 1½ hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and south-eastward from 1½ hours after high water until 4½ hours before the next high water;
 15 the maximum rate of both streams is from 4 to 5 knots.

Wu-sha men.—Islands and dangers.—The navigation of Wu-sha men or Mei-yü yang, (Sarah Galley channel) the next channel northward, is more intricate than either T'iao-chou men or Shih-p'eng Chiang; it is entered from south-eastward between Agnew point and
 20 Cambria point, the southern extremity of Chu-chia-chien, a large island situated about 5½ miles north-eastward. Wu-chu shan (Laush), a steep, cliffy islet, 150 feet (45^m7) high, with foul ground extending about 2 cables from its south-eastern side, lies in the entrance and about 3 miles east-north-eastward of Agnew point. Pan-ch'ao yen
 25 (Half-tide rock), which dries 11 feet (3^m4), lies about 1½ miles north-westward of Wu-chu shan (*Lat.* 29° 48' N., *Long.* 122° 23' E.).

Chi-lung shan (Vans islet) lies about half a mile northward of Agnew point. Hsüan-po-ku shan (Do-ying-pu-sa) is an island, 481 feet (146^m4) high, separated from Lwan point, the north-eastern extremity
 30 of T'ao-hua tao by a channel about a quarter of a mile wide; owing to the strong tidal streams and the uneven bottom this channel is unsafe.

Shou-hsien hsü (Usha island), situated on the north-eastern side of Wu-sha men and about 2 miles westward of Cambria point, is 617 feet (188^m1) high and has steep and cliffy coasts; its western extremity is
 35 fringed by rocks, and Leek islet, about 200 feet (61^m0) high, lies about 2 cables off its eastern side. A rock awash lies about 4 cables south-eastward of Leek islet, and a rock, which dries 2 feet (0^m6), lies in the middle of the northern entrance to the channel between this islet and Shou-hsien hsü. Cambrian pass, situated between Shou-hsien hsü and Sik-fong, the southern part of Chu-chia chien, is about
 40 2 cables wide, and the tidal streams through it attain rates of from 3 to 5 knots. Channel rocks are two small rocky patches, awash at high water, lying about 6 cables west-north-westward and north-westward, respectively, of the western point of Shou-hsien hsü.

Teng-pu tao (Tang-fau) is a large island, 607 feet (185^m0) high, which lies nearly one mile northward of Hsüan-po-ku shan; there are 3 islets, from 93 to 148 feet (28^m3 to 45^m1) high, and some rocks in the channel between, rendering it unsafe for navigation; Su-ying-pu-sa is the largest islet. Ta-ma-i tao (Silautse) is an island, 512 feet
 50 (156^m1) high, which lies about one mile westward of the western point of Teng-pu tao, and the channel between is mostly occupied by shoals and rocks, including Thompson rock, which dries 7 feet (2^m1), lying in mid-channel.

Cheng-tzu Chiang (Rambler channel), bounded on its southern side

Chart 1429.

by the northern coast of T'ao-hua tao, and on its northern side by the southern coast of Teng-pu tao and Ta-ma-i tao, is deep in the fairway, but at times it is almost blocked by fishing nets. Rambler spit, with depths of less than 2 fathoms (3^m7) over it, extends about half a mile northward of the western end of T'ao-hua tao; Hsiao-mi-i (Sinte) *Lat.* 29° 52' N., *Long.* 122° 14' E.), an islet 192 feet (58^m5) high, lies in the western entrance to the channel and about half a mile westward of the south-western point of Ta-ma-i tao. Tien-feng shan (Sir-mo-ni), a rock 37 feet (11^m3) high, lies about one mile westward 10 of Ta-ma-i tao.

Freemantle channel separates Teng-pu tao from the western side of Chu-chia-chien. Ta-k'ung-ku shan (Tien) is an islet, 123 feet (37^m5) high, on the western side of the southern entrance, and lies about 3 cables off the south-eastern point of Teng-pu tao; a shoal, with a 15 depth of less than 3 fathoms (5^m5) over it, and a rock, 70 feet (21^m3) high, on it, extends about half a mile eastward from the coast south-westward of this point. A shoal, with a depth of 3½ fathoms (5^m9) over it, extends about a quarter of a mile northward from Ta-k'ung-ku shan. Ni-lo shan (Yung), 119 feet (36^m3) high, is a steep-to islet 20 on the western side of the channel and about half a mile northward of Ta-k'ung-ku shan. Wu-shih shan (Russel islet), 80 feet (24^m4) high, lies on the eastern side of the channel and about a quarter of a mile northward of the western point of Sik-fong; a sunken rock lies close off its south-western end. Chia-teng shan (Hut islet), 127 feet 25 (38^m7) high, with a house on its summit, lies nearly three-quarters of a mile northward of Wu-shih shan; a rocky reef extends about 2 cables from its southern end. Another islet, 104 feet (31^m6) high, lies close north-eastward of Chia-teng shan. Tung-shan tao (Two Hummock island), 158 feet (48^m1) high, Hsi-shan tao (Duck islands), 30 consisting of two islands, 174 and 103 feet (53^m0 and 31^m4) high, respectively, and several islets and rocks, lie within a distance of one mile off the northern coast of Teng-pu tao; among these are Edna islets, 85 feet (25^m9) high, and Dale rock, which dries 10 feet (3^m0). Freemantle channel runs eastward and northward of Tung-shan tao, 35 and thence between Hsi-shan tao and Lu-shi shan (Lu-shi-san), an islet, 36 feet (11^m0) high, lying off the south-eastern extremity of Chou shan nearly 1½ miles northward. Large quantities of stout fishing stakes were observed, in 1934, northward of Ta-ma-i tao to within about half a mile of Lu-shi shan. 40

Directions.—Tidal streams.—A vessel proceeding through Wu-sha men from southward usually passes westward of Wu-chu shan (*Lat.* 29° 48' N., *Long.* 122° 23' E.), taking care to avoid Pan-ch'ao yen, and thence between Shou-hsien hsü and Channel rocks, and through 45 Freemantle channel. When rounding Tung-shan tao vessels should keep Lu-shi shan bearing not less than 295°, so as to clear the mud flat extending from the northern side of the channel.

The tidal streams set north-westward through Wu-sha men from 4½ hours before until 1½ hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and south-eastward from 50 1½ hours after high water until 4½ hours before the next high water; the maximum rate is about 3 knots.

Chu-chia-chien.—Islands and dangers.—Beacon.—Anchorage.—Chu-chia-chien is a large island lying south-eastward of Chou shan;

Charts 1199, 2412, 1262, 1263.

Chart 1429.

the northern part is known as Tong-sing, and the southern part as Sik-fong. At the southern end of Sik-fong are a number of remarkable peaks, about 1,200 feet (365^m8) high, and near the middle of the island is Ta shan (Chukia peak), a prominent smooth-topped cone, 1,257 feet (383^m1) high.

A mud bank, which dries, extends for as much as 2½ miles from the western side of Tong-sing to within about a quarter of a mile of the south-eastern extremity of Chou shan. On it are the islands Chin-ho shan (Fung-si-jok), 438 feet (133^m5) high; and Ssu-hsü shan (Ping-ku), 272 feet (82^m9) high; as well as some smaller islets and rocks. The south-western part of Chin-ho shan has the appearance of a separate island, and is known as Se-ing-do. A narrow channel, with a depth of a few feet in it, runs through this mud flat in a north and south direction. A stone pillar beacon stands on Feng-shui chiao (Chu-choi reef), lying about 4 cables north-westward of the north-western extremity of Chin-ho shan.

Wolf bay, situated on the eastern side of Sik-fong, is entered between Cuttatt point, lying about one mile northward of Cambria point, and Drayson islet, 145 feet (44^m2) high, about 1½ miles north-north-eastward. The bay is shoal, but affords anchorage to small craft in the north-east monsoon; some islets and rocks lie in its south-western part. Rocks extend about a quarter of a mile from the southern side of Drayson islet and terminate in Red islet, 71 feet (21^m6) high. Wai-huang chiao (Rocky islet), 80 feet (24^m4) high, lies about half a mile eastward of Red islet, and a reef extends about 2 cables southward from it; Wolf rock, with a depth of less than 6 feet (1^m8) over it, breaks with easterly winds and sea, and lies about 4 cables south-westward of Wai-huang chiao.

Pelican point is situated about 3½ miles north-north-eastward of Cambria point. A rock, with a depth of less than 6 feet (1^m8) over it, lies about half a mile southward of Pelican point, and Tooth rock, 60 feet (18^m3) high, lies about 4 cables east-north-eastward of this point.

Yangsi, 180 feet (54^m9) high, is an islet lying close off the north-eastern point of Tong-sing. Chu-tzu shan (Chakian), 224 feet (68^m3) high, an islet with two rocks above water off its northern side, lies about a quarter of a mile off the north-western point of Tong-sing.

Islets and dangers eastward of Chu-chia-chien.—Shang-p'an chiao (Pillar rock) (*Lat.* 29° 51' N., *Long.* 122° 26' E.), situated about 1½ miles east-north-eastward of Cambria point, is 98 feet (29^m9) high and peaked; foul ground extends about 2 cables north-eastward from this rock. Yeh-chu chiao (Pelican rock), which dries, lies about 2½ miles north-eastward of Shang-p'an chiao, and is usually marked by breakers.

Pei-t'ing tao or Piting, 152 feet (46^m3) high, lies about 4½ miles north-eastward of Shang-p'an chiao; two rocks above water lie off the north-western side of this islet, and a reef extends nearly 2 cables from its northern side.

Tung-t'ing tao or Tongting, 160 feet (48^m8) high, lies about 3½ miles east-south-eastward of Pei-t'ing tao and is the outermost islet in this locality. This islet is cleft in two from north to south, and is bare and rocky except for some small cultivated plots on the western side of the main and eastern parts; two detached rocks above water lie off the western end of the islet. See view facing page 307.

Charts 1199, 2412, 1262, 1263.

Chart 1429.

Pai-sha shan (Lakea), 500 feet (152^m4) high, lies with its southern extremity about 2½ miles north-north-eastward of Pelican point, and is separated from the eastern side of Tong-sing by Iffland channel, which is deep in the fairway. Chi-lung shan (Lakeati) is an islet, 204 feet (62^m2) high, lying close off the south-eastern point of Pai-sha shan, and a rock, with a depth of 1½ fathoms (3^m2) over it, lies close off the southern point of Pai-sha shan. Ch'ai shan (Pi-sha), 514 feet (156^m7) high, is connected to the north-western coast of Pai-sha shan by a reef. Tan shan (Eccles islet), 140 feet (42^m7) high, lies about a quarter of a mile eastward of the northern point of Pai-sha shan, with foul ground between. Edith islet lies on the western side of Tan shan. Lo-chia shan (Loka), 307 feet (93^m6) high, lies about 4 cables northward of Ch'ai shan.

East islet, 13 feet (4^m0) high, lies about 4 miles eastward of Lo-chia shan ; it is covered by a red sector of Lo-chia-shan light between the bearings 256° and 272°.

Lights.—Fog signal.—A light is exhibited, at an elevation of 180 feet (54^m9), from a white circular tower, 28 feet (8^m5) in height, situated on the summit of Tung-t'ing tao. A fog signal is sounded from the lighthouse. See view facing page 307.

A light is exhibited, at an elevation of 128 feet (39^m0), from a white circular stone tower, 29 feet (8^m8) in height, situated on the northern point of Lo-chia shan.

Islands and dangers northward of Chu-chia-chien.—Anchorage.—**Directions.**—P'u-t'o shan (Pu-tu), the sacred island of Chou-shan ch'ün-tao, lies with its south-eastern point about 2½ miles westward of Lo-chia shan ; it is 939 feet (286^m2) high and separated from the bank which extends from the northern side of Tong-sing and the eastern side of Chou shan by Lien-hua (Linhwa) yang. Anchorage can be obtained off the southern side of P'u-t'o shan, in depths of from 12 to 14 fathoms (21^m9 to 25^m6), good holding ground ; the maximum rate of the tidal streams at neap tides is stated to be 3 knots. Landing can be effected at a stone jetty extending from the southern coast of the island, where there is a depth of 6 feet (1^m8) ; the pier and its approaches are almost always encumbered with junks. Between the south-eastern and eastern points of P'u-t'o shan there is a shallow bay, with a sandy beach at the head. Cawston rock, which dries, lies about 1½ cables southward of the eastern point of the island. Hochung rock, a pinnacle with a depth of 1½ fathoms (3^m2) over it, lies about one mile east-south-eastward of the same point. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about half a mile from the western side of P'u-t'o shan and about one mile from its northern side ; Huo-sha shan, an islet, 213 feet (61^m9) high, lies on this bank and close off the northern point of the island.

Hu-lu shan (Isthmus island), 288 feet (87^m8) high, lies about three-quarters of a mile eastward of the northern extremity of P'u t'o shan, and there is a deep channel between ; Joseph islet (*Lat.* 30° 03' N., *Long.* 122° 24' E.), 34 feet (10^m4) high, lies in the northern entrance of this channel, and there is a deep channel on either side of it. Helby rock, a pinnacle with a depth of 3½ fathoms (5^m9) over it, lies about 2 cables southward of the southern point of Hu-lu shan. A rock, 6 feet (1^m8) high, lies about 3½ cables eastward of the eastern point of the island, and a reef extends a quarter of a mile south-

Charts 1199, 2412, 1262, 1263.

Chart 1429.

westward from it. Grant rock, with a depth of $3\frac{1}{2}$ fathoms (6^m4) over it, lies nearly three-quarters of a mile eastward of the northern point of the island; a reef extends about 4 cables northward from this point, and near its outer end is Marines islet, a black rock 30 feet (9^m1) high.

Charts 1429, 2974.

Andrews rock, (*Lat.* $30^\circ 04' N.$, *Long.* $122^\circ 25' E.$), lying about 3 cables north-north-eastward of Marines islet, has a least depth of $1\frac{1}{2}$ fathoms (2^m7) over it, and is marked by tide-rips.

- 10 Wai-huo hsü (Pu-pi-san), situated nearly 2 miles east-north-eastward of Marines islet, is an islet covered with grass, and has a well-defined summit, 152 feet (46^m3) high.

Shalu rocks are a group of four prominent black rocks and five smaller ones, with some sunken rocks around. The south-western 15 and highest rock lies nearly $1\frac{1}{4}$ miles south-eastward of Wai-huo hsü and is sharp, precipitous, and 54 feet (16^m5) high; foul ground extends about 2 cables south-westward from this rock. There is a clear passage between these rocks and Wai-huo hsü. Shalu rocks are steep-to, and sounding gives no warning; vessels from southward, 20 bound for Chu-hsü chiang (Tai-shan channel) (page 340), or Ch'ang-t'u chiang (Chang-tau harbour) (page 341) may pass westward of Wai-huo hsü, passing fairly close to it so as to avoid Andrews rock. Shalu rocks and the islands between them and P'u-t'o shan are covered by a red sector of Lo-chia-shan light between the bearings 25 088° and 202° , but the eastern limit of this sector passes close eastward of the rocks.

Charts 1429, 1199.

Chou shan.—Chou shan (Chusan), the largest island in Chou-shan ch'ün-tao, is mountainous, rising in Huang-yang-chien (Chusan East 30 peak), situated in the eastern part of the island, to an elevation of 1,670 feet (509^m2). The plains and many of the hills are richly cultivated, and the island is thickly populated; Ting-hai city, the capital, is situated on the southern coast. The summer at Chou shan and in its vicinity is often damp and enervating.

- 35 Ting-hai chiang (harbour), on the southern coast of Chou shan, with its approaches, is described on page 327. The western coast of Chou shan is described with Ts'e-tzu shui-tao (Blackwall channel), on page 323.

Chart 1429.

- 40 **South-eastern extremity of Chou shan.—Off-lying islands and dangers.—Tidal streams.**—The south-eastern extremity of Chou shan is fronted by a number of islands and islets, connected to each other by a partly drying bank, within which is the eastern part of Shen-chia shui-tao (Sinkea channel) an inshore passage leading to Ting- 45 hai chiang. Hsiao-kan shan (Siau-kau), the largest of these islands, is 284 feet (86^m6) high and situated about $3\frac{1}{4}$ miles westward of Entrance point, the south-eastern point of Chou shan; several rocks, the highest being 46 feet (14^m0) high, lie within a distance of 6 cables from the southern coast of Hsiao-kan shan; an islet, 147 feet (44^m8) 50 high, lies about half a mile westward of Hsiao-kan shan, on a mud bank which extends about $1\frac{1}{4}$ miles north-westward from this island and dries; two rocks, 35 and 42 feet (10^m7 and 12^m8) high, respectively, lie off the eastern coast of this island, and on the outer edge of a mud bank which dries.

Charts 1124, 1199, 2412, 1262, 1263.

Chart 1429.

Ma-ch'in shan (Mautse) (*Lat.* 29° 56' N., *Long.* 122° 16' E.), an island 227 feet (69^m2) high, lies about one mile south-eastward of Hsiao-kan shan, and has a rock, with a depth of less than 6 feet (1^m8) over it, about one cable off its eastern side. Lu-chia hsü (Lokea) 5 267 feet (81^m4) high, lies about 1½ miles eastward of Ma-ch'in shan. The three Helby islets, including Haslar islet, 42 feet (12^m8) high, lie off the southern side of Lu-chia hsü, on the mud flat, which dries, surrounding that island. Lu-shi shan, lying about half a mile southward of Lu-chia hsü, was described on page 311; a rock, with a depth 10 of less than 6 feet (1^m8) over it, lies about half a cable off the south-eastern side of this islet.

There is a channel about 2 cables wide, with a least depth of 3½ fathoms (6^m4), between the mud flats, which dry, extending eastward from Lu-chia hsü and those extending westward from Tong-sing; the eastern side of this channel, opposite Entrance point, is marked by Fen-shui-chiao beacon (page 312). A rock, with a depth of 2 feet (0^m6) over it, lies in the southern entrance to this channel and about 1½ miles southward of Fen-shui-chiao beacon. The flat in the northern approach to this channel can be crossed in a least 20 depth of 1½ fathoms (2^m7). The north-going stream in this channel runs from 4½ hours before until 1½ hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and the south-going stream from 1½ hours after high water until 4½ hours before the next high water; the maximum rate is from 3 to 4 knots. 25

Anchorage.—Small vessels with local knowledge can obtain anchorage in Shen-chia shui-tao, in a depth of 5½ fathoms (10^m1), off the town of Shen-chia-men (Sinkeamun), situated on the northern side of the channel opposite Lu-chia hsü; this harbour affords shelter in a typhoon. The south-western entrance, between Ma-ch'in shan and 30 the mud flat extending westward from Lu-chia hsü, has a depth of 2½ fathoms (4^m6). Fish, eggs and vegetables can be obtained at Shen-chia-men.

In 1936, H.M.S. *Berwick* anchored south-westward of Hsiao-kan shan, with the summit of Ma-an shan (Mun-du-san), an islet situated 35 about 2½ miles westward of Hsiao-kan shan, bearing 308°, distant about 2½ miles; the holding ground was good, but the anchorage is unsheltered and the tidal streams were sufficiently strong to prevent the vessel swinging to the wind.

Eastern and north-eastern coasts of Chou shan.—Off-lying islands 40 and dangers.—Ch'i-ch'i shan (Hwang head), the eastern extremity of Chou shan, is situated about 4½ miles north-north-eastward of Entrance point and on the western side of Lien-hua yang (page 313); it is a peninsula 193 feet (58^m8) high, connected to the main island by a low isthmus. Lilion islet, 65 feet (19^m8) high, lying on the edge of 45 the mud flat, which dries, extending from this part of the coast, lies about one mile southward of Ch'i-ch'i shan and nearly half a mile offshore. A rocky patch, which dries, lies about 1½ miles north-westward of Ch'i-ch'i shan and 3 cables offshore; about three-quarters of a mile further north-westward is an islet named Heng shan (Ta- 50 chen), 113 feet (34^m4) high.

Charts 1429, 2974.

Chenau point (*Lat.* 30° 04' N., *Long.* 122° 17' E.), the north-eastern point of Chou shan, is about 3½ miles north-westward of Ch'i-ch'i shan.

Charts 1124, 1199, 2412, 1262, 1263.

Charts 1429, 2974.

- Liang-heng shan or Ta-liang shan (Tsae), an island lying on an extensive drying flat, lies with its southern point about three-quarters of a mile northward of Chenau point, and there is a rock 39 feet (11^m9) high, and some sunken rocks, between ; this island lies on the outer edge of the shore bank, and there is no safe passage between it and the coast of Chou shan. It has two prominent hills on it, each about 600 feet (182^m9) high ; the western side of the island is cultivated, and the eastern side is very steep and is covered with grass. Hsiao-liang-heng shan (Hwa islet), with some rocks above water, including one 39 feet (11^m9) high, close off its northern end, lies close off the northern point of Liang-heng shan. Nin-t'ou shan, an islet, 114 feet (34^m7) high, with a rock awash close off its eastern side, lies nearly three-quarters of a mile westward of Hsiao-liang-heng shan. Fossett rock, with a depth of 2½ fathoms (5^m0) over it, and steep-to, lies about half a mile north-north-eastward of Hsiao-liang-heng shan ; during the strength of the tidal streams this rock is marked by tide-rips. A rock, 4 feet (1^m2) high, lies about three-quarters of a mile eastward of Hsiao-liang-heng shan.
- Huang-t'ò shan (Mei-yun), an island, 382 feet (116^m4) high, lies about 3 cables eastward of the eastern point of Liang-heng shan, and has a well defined summit ; there is a deep passage between it and Liang-heng shan. Ching-t'ò shan (Mei-ting), 146 feet (44^m5) high, lies about three-quarters of a mile east-south-eastward of Huang-t'ò shan ; there is foul ground for about 3 cables off its north-western point. Eaves rock, lying about 4 cables eastward of Ch'ing-t'ò shan, is 27 feet (8^m2) high. Shang-hsia-ch'i (Jau islet), 114 feet (34^m7) high, lies nearly 1½ miles north-eastward of Eaves rock ; rocks lie within about one cable of its eastern, northern, and western points.
- The passage between Shang-hsia-ch'i and Eaves rock is safe for vessels of any draught, but vessels bound for Chu-hsü Chiang usually pass north-eastward of the islet ; the passages between Eaves rock and Ch'ing-t'ò shan, and between Ch'ing-t'ò shan and Huang-t'ò shan, should not be attempted.
- The coast between Chenau point and Kanlan point (*Lat. 30° 07' N., Long. 122° 10' E.*), situated about 7 miles north-westward, is indented with several bays, but they are all filled with mud flats. Tiao-men shan (Thornton island), 387 feet (118^m0) high, lies on the mud flat, which dries, extending from a point situated about 3½ miles north-westward of Chenau point ; there is a joss-house, surrounded by a wall, on the summit of the island. This island is cultivated, and there is a village on its southern side ; foul ground, with an islet, 64 feet (19^m5) high, on it, extends about half a mile north-eastward from the island, and a 5-fathom (9^m1) patch lies about 3 cables northward of the islet.

Between the point abreast of Tiao-men shan and a point situated about one mile westward of Kanlan point, the coast recedes and forms a deep indentation filled by a drying flat. Ma hsü, 183 feet (55^m8) high, lies near the eastern end of this indentation, and Wai-shan tsui is a point lying about one mile southward of its western entrance point.

Chart 2974.

Hsiu (Su) shan is a large hilly island, 676 feet (206^m0) high, lying with its southern extremity nearly 1½ miles northward of Kanlan

Charts 1124, 1199, 2412, 1262, 1263.

Chart 2974.

point. Harty islets, from 49 to 190 feet (14^m9 to 57^m9) high, lie on the mud flat, which dries, extending from the north-eastern point of Hsiu shan, and a bank, with depths of less than 3 fathoms (5^m5) over it, extends about 2½ miles from the south-eastern side of Hsiu shan. 5

A bank, with depths of less than 3 fathoms (5^m5) over it, extends about 1½ miles westward from the northern end of the western side of Hsiu shan. A number of islets lie on the drying banks fronting the western side of the island. A chain consisting of two islets, 207 and 145 feet (63^m1 and 44^m2) high, respectively, and a rock, 58 10 feet (17^m7) high, extends about 1½ miles westward from the centre of the western side of the island, and a bank, with depths of from 2½ to 5 fathoms (4^m6 to 9^m1) over it, extends about one mile further in the same direction. The islets off the northern side of the island are described on page 343. 16

Kuan-men chiang (Kwei channel), lying between Hsiu shan and Chou shan, is much encumbered with islets and reefs, the positions and heights of which can best be seen on the chart. Ch'ing shan (Grain islet), 261 feet (79^m5) high, situated off the southern point of Hsiu shan, is the largest islet; a rock, 64 feet (19^m5) high, lies nearly 20 half a mile south-south-eastward of it, with foul ground between. Ping shan, 173 feet (52^m7) high, and Hsia-yu shan, 204 feet (62^m2) high, lie, respectively, close north-eastward and about three-quarters of a mile south-westward of Ch'ing shan. The channel is barely 4 cables wide between Kanlan point and the 64-foot (19^m5) rock 25 south-south-eastward of Ch'ing shan; the tidal streams are rapid. Molyneux rock, with a depth of 2 fathoms (3^m7) over it, lies about three-quarters of a mile north-westward of Ch'ing shan.

Tidal streams.—In Kuan-men chiang, the west-going stream runs from about 3 hours before until 3 hours after the time of high water 30 at Yangtze approaches (Admiralty Tide Tables Standard Port), and the east-going stream from about 3 hours after high water until 3 hours before the next high water there.

Northern coast of Chou shan.—Off-lying islands and dangers.—The northern coast of Chou shan between Kanlan point (*Lat.* 30° 07' 35 *N.*, *Long.* 122° 10' *E.*) and the north-western point of the island, situated about 10 miles westward, is deeply indented and well cultivated.

Ch'ang-pai shan (Chang-pei), an island situated about 4½ miles westward of Hsui shan, has a central range of hills, with a well 40 defined summit, 812 feet (247^m5) high, in the north-eastern part of the island. A spit, with a depth of less than 3 fathoms (5^m5) over it, extends about three-quarters of a mile from its south-eastern side, and, in 1934, fishing stakes were found to extend 1½ miles eastward 45 from this spit. A rock, 116 feet (35^m4) high, lies about 4 cables northward of the north-western point of Ch'ang-pai shan, and another rock, 45 feet (13^m7) high, lies 2 cables further in the same direction. The western and north-western coasts of the island are indented by several bays, but they are all filled by a mud flat which dries; a spit, with a depth of less than 3 fathoms (5^m5) over it, extends about 1½ 50 miles west-north-westward from the western point of the island. Ch'ang-pai chiang, the channel between Ch'ang-pai shan and the northern coast of Chou shan, is about half a mile wide, but there are some rocks, with a least depth of 3½ fathoms (5^m9) over them, in it.

Charts 1124, 1199, 2412, 1262, 1263.

Chart 1124.

Maum shan, 987 feet (300^m8) high, lies on the drying mud flat which extends about 2½ miles north-westward from the north-western point of Chou shan, and has a scattered population. A rock 74 feet (22^m6) high, lies on the flat between Maum shan and Chou shan, and rocks, 138 and 38 feet (42^m1 and 11^m6) high, respectively, lie off the western side of Maum shan. Crack island, 159 feet (48^m5) high, lies about three-quarters of a mile north-westward of Maum shan, and is prominent and rocky; a rocky islet, 46 feet (14^m0) high, lies close off the northern point of this island. The channel between Crack island and Maum shan is deep, but it is narrowed to a width of about 4 cables by a spit, with a depth of less than 3 fathoms (5^m5) over it, extending about one mile north-westward from the latter island.

Off-lying islets.—Wu hsü (Dunsterville islets) is a group of five islets, the southern and largest of which is 147 feet (44^m8) high and lies about 2½ miles north-westward of Crack island (*Lat.* 30° 12' N., *Long.* 121° 56' E.). The depths around these islets are very irregular, and the tidal streams are rapid. A bank, with depths of from 3½ to 4½ fathoms (6^m4 to 8^m7) over it, lies between Wu hsü and Crack island.

Chart 1429.

INSHORE PASSAGE WESTWARD OF CHOU-SHAN CH'ÜN-TAO.—**General remarks.**—Between Chou-shan ch'ün-tao and the mainland, there is a route which may be used by vessels of moderate size proceeding to or from Shang-hai. Vessels taking this route from southward pass through Niu-pi-shan shui-tao (page 296); the passage can be entered from the south-eastward through T'iao-chou men (page 308), Shih-p'eng chiang (page 309), or Wu-sha men (page 310).

As this inshore passage is not lighted, except for the light on Ta-ts'ai-hua shan (Fangshi) (page 325), it is advisable to navigate the whole area between Chiu-shan lieh-tao (page 299) and Hsi-hou men (Blackwall pass) (page 325) during the daytime. The time of the moon's meridian passage at Greenwich, as shown in the Nautical Almanac, added to 7½ hours, gives the local mean time at which a vessel should be abreast Fo-tu shan (Fa-tu) situated in the southern entrance to the inshore passage, in order that vessels proceeding northward may obtain full advantage of the north-west going tidal stream.

Coast.—Islands and dangers.—The coast of the mainland between the entrance to Ta-sung chiang (page 303) and Ch'i-t'ou chiao (Ketau point), situated nearly 20 miles north-eastward, is fringed for the greater part by mud flats which dry, although the salient points along the north-eastern half of this coast are mostly steep-to.

Bateman islet, situated about 4½ miles north-eastward of Huang-nui chiao (page 302), is covered with grass and scrub, and has a round top, 82 feet (25^m0) high; a rock, 5 feet (1^m5) high, lies about 1½ cables southward of the islet. Yang-sha shan (Yang-sor) consists of two islets lying close together on the edge of the mud flat which extends nearly 2 miles offshore here; the eastern islet is 225 feet (68^m6) high and lies about one mile north-westward of Bateman islet, and a rock, 2 feet (0^m6) high, lies about 2 cables east-south-eastward of its southern extremity; the western islet is 103 feet (31^m4) high. A rock, 28 feet (8^m5) high, lies about 1½ miles north-eastward of Yang-sha shan (*Lat.* 29° 45' N., *Long.* 121° 54' E.).

Charts 1124, 1199, 2412, 1262, 1263.

Chart 1429.

Mei shan, 490 feet (149^m3) high, lies with its southern point about 3 miles north-eastward of Bateman islet, and appears to have consisted formerly of one large island and several islets, which are now united by substantial stone walls stretching from point to point; the entire area within the walls is cultivated with rice and cotton, and is well populated. A mud flat extends from all sides of Mei shan except the north-western, and three rocky islets, from 18 to 50 feet (5^m5 to 15^m2) high, lie on this flat eastward of the southern point of the island. Damson islands, consisting of Ch'ing-lung shan 232 feet (70^m7) high, and P'u-she shan (Pak-shei), 160 feet (48^m8) high, lie close off the eastern point of Mei shan. A rock, with a depth of 3 fathoms (5^m5) over it, lies about 2 cables eastward of the southern point of Ch'ing-lung shan. Combe rock, lying nearly 2 cables south-eastward of the southern point of P'u-she shan, is a pinnacle with a depth of 3 feet (0^m9) over it.

Mei-shan chiang or Hai-shan chiang, (Junk channel), separating Mei shan from the mainland, has general depths of from 4 to 6 fathoms (7^m3 to 11^m0), except in the south-western part, where it shoals to 1½ fathoms (2^m7) and less; it is not used for navigation.

Hsing-lo shan (Sing-lo san) (*Lat.* 29° 52' N., *Long.* 122° 06' E.), lying close to the coast about 2½ miles south-westward of Ch'i-t'ou chiao, is a rocky islet with a sharp summit, 136 feet (41^m4) high.

Ch'i-t'ou yang.—**Islands and dangers.**—**Anchorage.**—Ch'i-t'ou yang (Fa-tu channel) situated between the coast just described and the north-western side of Liu-heng tao, is entered from southward by three channels, namely, Ting-tzu chiang (Roberts pass), Gough pass, and Shuang-hsü chiang (Duffield pass). Gough pass, the central one of the three, is the best, as it is free from dangers, and the shores on both sides are steep-to.

Ting-tzu chiang, the western channel, lies between the mud flat which extends south-westward from Mei shan, and Central islets; it is about 3 cables wide in its narrowest part and its fairway is deep. A mud bank, with depths of less than 3 fathoms (5^m5) over it, extends about 4 cables south-westward from Ting-tzu shan (Latau san), the largest and south-western of Central islets, which is 191 feet (58^m2) high; a rock, 26 feet (7^m9) high, lies on the north-western edge of this bank. Three islets, from 67 to 129 feet (20^m4 to 39^m3) high, lie north-eastward of Ting-tzu shan, and a rock, which dries 4 feet (1^m2), lies nearly one cable north-eastward of the north-eastern islet. Ting-tzu chiang is not recommended, as sounding gives no warning of approach to the mud bank forming the north-western side of the channel, and, when the mud is covered, the appearance of the pass is deceptive.

Gough pass, lying between Central islets and Fo-tu shan, is half a mile wide at the narrowest part and its fairway is deep. Fo-tu shan (Fa-tu) is a large island with a range of hills on it covered with grass, with a well defined summit, 604 feet (184^m1) high, near the northern end of the island; there are several villages, and the reclaimed land is well cultivated. Hsiao-fo-tu (St. Andrew island), an island lying about 2 cables off the southern extremity of Fo-tu shan and connected to it by a mud flat which dries, is 403 feet (122^m8) high and rocky. Wen-chou hsü (Wen-chau island) lies about a quarter of a mile south-westward of Hsiao-fo-tu, with a deep passage between,

Charts 1199, 2412, 1262, 1263.

Chart 1429.

and is 253 feet (77^m1) high and covered with grass; a 3-fathom (5^m5) patch lies about 1½ cables southward of the island. The tidal streams are very rapid in the channel between Wen-chou hsü and
 5 Hsiao-fo-tu (*Lat.* 29° 43' N., *Long.* 122° 01' E.). Niu-ling-t'ou (Chloe island), 140 feet (42^m7) high, lies about 3 cables northward of the north-eastern point of Fo-tu shan, with Joe-tse shan, 72 feet (21^m9) high, between; a rock, which dries 5 feet (1^m5), lies about one cable off the north-western side of Niu-ling t'ou. Hsia-fo-tu (Hebe
 10 island), 230 feet (70^m1) high, lies about a quarter of a mile north-eastward of the north-eastern point of Fo-tu shan.

Shuang-hsü chiang (Duffield pass), situated between Fo-tu shan and the western coast of Liu-heng tao, is entered from southward between Hsiao-fo-tu and Duffield rocks (page 301). A rock, 77 feet
 15 (23^m5) high, lies about 4 cables north-north-eastward of the eastern point of Hsiao-fo-tu, with a rock, which dries 5 feet (1^m5), close off its eastern side, and a 3-fathom (5^m5) patch between. A rock, 32 feet (9^m8) high, lies about 2 cables west-north-westward of the 77-foot (23^m5) rock, and within a distance of 2 cables northward of it are
 20 two smaller rocks, 3 feet (0^m9) and 30 feet (9^m1) high, respectively. A rock, 25 feet (7^m6) high, lies close inshore off the eastern side of Fo-tu shan about one mile from its southern extremity, and another, 74 feet (22^m6) high, lies half a mile further north-eastward. The western coast of Liu-heng tao, between Clarence point (page 301)
 25 and Yutin point, situated about 4 miles northward, is fairly steep-to and the slopes of the hills are wooded. Pan-fang chiao (Tancred rock), 3 feet (0^m9) high, lies about 1½ miles northward of Clarence point and one cable offshore. Shuang hsü (The Notches) consists of two rugged islets, about 50 feet (15^m2) high, lying about half a mile
 30 westward of Pan-fang chiao, with a clear and deep channel between; a rock, which dries 8 feet (2^m4) lies about 2 cables westward of Shuang hsü, and the passage between these islets and Fo-tu shan should not be used. Barrow point is situated on the eastern side of Fo-tu shan, about half a mile southward of its north-eastern point.
 35 Young Hebe rock, with a depth of 1½ fathoms (3^m2) over it, lies on the western side of the channel and about 2 cables eastward of Hsia-fo-tu; a 5-fathom (9^m1) patch lies about 4 cables north-eastward of Hsia-fo-tu. Bird rock (*Lat.* 29° 46' N., *Long.* 122° 04' E.), lying about 6 cables south-westward of Yutin point and one cable
 40 offshore, dries 10 feet (3^m0); an islet, 24 feet (7^m3) high, lies about a quarter of a mile southward of Bird rock.

Anchorage can be obtained off the northern coast of Liu-heng tao between Yutin point and Tung-lang tsui, situated about 2½ miles east-north-eastward, in a depth of about 13 fathoms (23^m8), mud;
 45 anchorage can also be obtained, in moderate depths, off the coast of the mainland between Damson islands and Ch'i-t'ou chiao. Fishing stakes were observed to extend, in 1934, for about a mile west-south-westward from Tung-lang tsui.

Tidal streams.—The tidal streams in Gough pass and Shuang-hsü
 50 chiang run north-eastward from 3 hours before until 3 hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and south-westward from 3½ hours after high water until 2½ hours before the next high water; the time of the turn of the stream is slightly advanced or retarded by the direction of the prevailing

Charts 1199, 2412, 1262, 1263.

Chart 1429.

wind. The maximum rate is from 3 to 5 knots, according to the age of the moon.

Coast.—Off-lying island.—Island.—Shoal.—Ch'i-t'ou chiao or Ketow point (Ketaw point) is bold and steep-to; between this point and Pei-ch'i-t'ou chiao (North Ketaw point), lying nearly $2\frac{1}{2}$ miles north-north-westward, the land rises abruptly in grass-covered ridges to Ch'i-t'ou shan (Ketaw peak), 1,286 feet (392^m4) high and situated about midway between the two points. The promontory, of which Ch'i-t'ou chiao is the eastern extremity, is mountainous, the highest peak being Ta-pai shan (Mount Union), 2,143 feet (653^m2) high, situated nearly 20 miles westward of Ch'i-t'ou chiao; Mount Warn, 1,592 feet (485^m2) high, is situated about $10\frac{1}{2}$ miles westward of Ch'i-t'ou chiao. The country is well populated and cultivated, the plains being covered with rice and cotton fields, and the valleys terraced with small plantations, in places to an elevation of 800 feet (243^m8); there are many patches of cultivation on the summits of the highest mountains.

Roundabout island, situated about one mile north-eastward of Ch'i-t'ou chiao, is steep, rocky, and has a round summit, 121 feet (36^m9) high, covered with grass; a rock, 2 feet (0^m6) high, lies about half a cable off the southern point of the island and is connected to it by a drying ridge. The channel between Roundabout island and the coast westward is deep, and it can be navigated by vessels, but there are heavy tide-rips and strong eddies; it should not be used by vessels unable to maintain a speed of 10 knots when there is a spring tidal stream against them.

From Pei-ch'i-t'ou chiao the coast trends westward for about $5\frac{1}{2}$ miles to Wai-hsü shan (La-chi), an island, 404 feet (123^m1) high, almost completely filling a deep indentation in the coast. The greater part of this stretch of coast is fronted by mud flats between the salient points. A rock, 10 feet (3^m0) high, lies close inshore about a quarter of a mile westward of Pei-ch'i-t'ou chiao, and a shoal, with a depth of 10 fathoms (18^m3) over it, lies about half a mile offshore about $2\frac{1}{2}$ miles further westward.

Tidal streams.—The rate of the tidal streams near Roundabout island varies from 2 to 6 knots, and there are whirls and eddies caused by the meeting of the various streams, the water never being at rest. As a rule the tidal streams northward of the island run north-westward from $3\frac{1}{2}$ hours before until $1\frac{1}{2}$ hours after high water at Yangtze approaches, and south-eastward from $1\frac{1}{2}$ hours after high water until $3\frac{1}{2}$ hours before the next high water.

Ta-hsieh shan and adjacent islands and dangers.—Ta-hsieh (Tai-shei) shan or Ta tao lies close off the coast of the mainland with its south-eastern extremity about $6\frac{1}{2}$ miles westward of Pei-ch'i-t'ou chiao (*Lat. $29^{\circ} 55' N.$, Long. $122^{\circ} 07' E.$*). The greater portion of this large island is hilly, rising to a double peak 1,079 and 1,089 feet (328^m9 and 331^m9) high, but there are some plains cultivated with rice and protected by reclamation walls; there are numerous villages on the island. The indentations in the coasts of the island are mostly filled by mud flats, which are steep-to except on the western side, where a flat extends as much as three-quarters of a mile to a depth of 3 fathoms (5^m5).

Several islands lie off the south-eastern part of Ta-hsieh shan.

Charts 1199, 2412, 1262, 1263.

Chart 1429.

Kuan-men chiao (Bug-gei), the easternmost of these, lies about $4\frac{1}{2}$ miles westward of Pei-ch'i-t'ou chiao, and is a rocky islet, 49 feet (14^m9) high, covered with grass and bushes; a rock, awash at high water, lies about 2 cables south-westward of this islet, and a 6-fathom (11^m0) patch lies about half a mile south-south-eastward of it, with an 8-fathom (14^m6) patch between. Pai-yu shan (Da-mo), an islet situated about 4 cables north-westward of Kuan-men chiao, has a well defined summit 192 feet (55^m5) high; a rock, 3 feet (0^m9) high, lies about 2 cables southward of it. Ch'uan-pi shan (Cheun-pi), situated between Pai-yu shan and the eastern coast of Ta-hsieh shan, is 580 feet (176^m8) high and cultivated in patches up to its summit. Wai-shen-ma shan (Na-sing-mei) and Nei-shen-ma shan (Li-sing-mei) are islands in the eastern approach to Ta-hsieh-shan hang-men (Tai-shei-shan pass), which separates Ta-hsieh shan from the coast southward; a shoal spit extends about 6 cables eastward from Wai-shen-ma shan. A rock, which dries 9 feet (2^m7), lies near the middle of the fairway of the passage south-eastward of Wai-shen-ma shan, and there is a rock awash about 3 cables further eastward. Nei-shen-ma shan is 366 feet (111^m6) high. Ch'ang-yao-ch'en (Spit island), 95 feet (29^m0) high, and Red islet, 114 feet (34^m7) high, lie in Ta-hsieh-shan hang-men, which is very narrow in places, and is obstructed by rocks, above and below water, shoals and fishing nets.

Yu-en-su (*Lat.* 29° 57' N., *Long.* 121° 58' E.), an islet 22 feet (6^m7) high, lies close off Insular point, the northern extremity of Ta-hsieh shan. An islet, 63 feet (19^m2) high, lies about $1\frac{1}{2}$ miles south-eastward of Yu-en-su and about 2 cables offshore. Silu point lies about $1\frac{1}{2}$ miles west-south-westward of Insular point, with a deep bay, filled by a drying mud flat, between; two rocks, 3 and 17 feet (0^m9 and 5^m2) high, respectively, lie in this bay.

Ta-hsieh-shan chiang. — Anchorage. — Tidal streams. — Ta-hsieh-shan chiang (Tai-shei-shan harbour), situated between Ta-hsieh shan and the mainland south-westward, is sheltered from all directions. The entrance, between the flat extending from the western coast of Ta-hsieh shan southward of Silu point and that extending from the mainland northward of Tung-lu point, is about 3 cables wide, with depths of from 4 to 6 fathoms (7^m3 to 11^m0); within the entrance the depths increase to as much as 15 fathoms (27^m4). The south-eastern limit of the harbour is abreast a rock, which dries 7 feet (2^m1), lying off the mainland and about 7 cables north-westward of the southern point of Ta-hsieh shan. The village of Hou-so-ch'eng (Hau-sor) lies on the mainland about one mile south-eastward of the head of the harbour.

In fine weather open anchorage can be obtained, in depths of from 7 to 12 fathoms (12^m8 to 21^m9), mud, northward of the bar at the entrance to the harbour; it is sometimes convenient to wait here for daylight to approach Yung chiang (river) (page 346). Good anchorage can be obtained inside the harbour, in depths of from 8 to 15 fathoms (14^m6 to 27^m4); it is necessary to moor to keep the anchors clear.

The tidal streams run north-north-westward from 3 hours before until 3 hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and south-south-eastward from 3 hours after high water until 3 hours before the next high water.

Charts 1199, 2412, 1262, 1263.

Chart 1429.

Lights.—A light, privately maintained, is exhibited, at an elevation of 24 feet (7^m3), from an iron tripod on a concrete base situated on the drying rock at the head of Ta-hsieh-shan chiang.

A light, privately maintained, is exhibited, at an elevation of 48 feet (14^m6), from a tower, 40 feet (12^m2) in height, on the western extremity of Ta-hsieh shan (*Lat.* 29° 55' N., *Long.* 121° 56' E.).

A light, privately maintained, is exhibited, at an elevation of 36 feet (11^m0), from an iron tripod on a concrete base on the mud flat on the eastern side of the entrance to Ta-hsieh-shan chiang.

Directions.—A vessel making for Ta-hsieh-shan chiang from eastward should keep Yu-en-su open northward of the northern side of Ta-hsieh shan until Huang-niu chiao (Just-in-the-way) (page 326) bears 338°, distant about 1½ miles. The harbour can then be entered with the 1,560-foot (475^m5) high summit situated about half a mile north-eastward of Mount Warn in line with a hill, 368 feet (112^m2) high, at the head of the harbour, bearing about 155°; this mark, which must be followed closely, leads over the bar in a least depth of 5 fathoms (9^m1). When abreast the village on the western point of Ta-hsieh shan a mid-channel course can be steered to a convenient anchorage.

Pai-ya yang.—**Tidal streams.**—Pai-ya yang (Tower Hill channel) is situated between the coast of the mainland westward of Pei-ch'i-t'ou chiao, and the islands Kuan-men chiao, Pai-yu shan, Ch'uan-pi shan and Ta-hsieh shan, on the south; and the islands Ao shan (san), Chai-jo shan (Tsen-yo san), Hsiao-mao shan (Jau), and Ta-mao shan (Ta-mau), all lying off the western part of the southern coast of Chou shan (*see* pages 328 to 331), on the north.

Pai-ya yang is free from dangers, and is deep throughout. There are, however, heavy tide-rips, and the rate of the tidal streams varies from 3 to 7 knots, according to the age of the moon; it is advisable to keep in mid-channel. Off Ta-mao shan the tidal streams run north-westward from 3 hours before until 3 hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and south-eastward from 3 hours after until 3 hours before the next high water. The maximum rate is from 3 to 7 knots, according to the age of the moon.

Ts'e-tzu shui-tao.—**Islands and dangers.**—Ts'e-tzu shui-tao (Black-wall channel), situated between the southern part of the western coast of Chou shan and Chin-t'ang shan (Kin-tang), the largest of the islands lying westward of that island, is a continuation northward of Pai-ya yang. The western coast of Chou shan, which forms the eastern side of the channel, is fringed by a broad mud flat for about 4 miles north-north-westward of Yang-lo chiao (Yang-loi point), the south-western extremity of Chou shan; a rock, 33 feet (10^m1) high, lies on the edge of this flat and about 2½ miles north-north-westward of Yang-lo chiao.

Wai-tiao shan (Wateo) is a hilly islet, 335 feet (102^m1) high, lying about 4½ miles north-westward of Yang-lo chiao and 4 cables offshore; a shoal, with depths of less than 3 fathoms (5^m5) over it, extends about half a mile south-eastward from Wai-tiao shan, and a mud flat extends about 4 cables from the western side of the island. A rock, 8 feet (2^m4) high, lies about 3 cables southward of this island.

The south-eastern and eastern coasts of Chin-t'ang shan are fairly

Chart 1429.

steep-to, and a ridge of hills rises close within ; Ma-an shan (Saddle hill), 1,416 feet (431^m6) high, situated about one mile west-north-westward of Algerine point, the south-eastern extremity of the island, and Hsien-jen shan (Kin-tang peak), 1,488 feet (453^m5) high, about 1½ miles northward of Ma-an shan, are prominent. A rocky spit extends about 2 cables south-eastward from Algerine point, and terminates in a rock which dries one foot (0^m3). The western coast of Chin-t'ang shan is described on page 327.

10 Pan-yang chiao (Steward islet), black, rugged, and steep-to, is 37 feet (11^m3) high and lies in the middle of Ts'e-tzu shui-tao and about 2 miles north-eastward of Algerine point (*Lat.* 30° 00' N., *Long.* 121° 55' E.) ; a rock, with a depth of 2½ fathoms (4^m1) over it, lies about 3 cables north-eastward of Pan-yang chiao. Owing to the strong tidal streams, which attain a rate of from 3 to 8 knots, it is advisable to keep in mid-channel between Pan-yang chiao and Chin-t'ang shan.

Ts'e-tzu shan (Blackwall island), 903 feet (275^m2) high, is a large island lying with its southern end about 1½ miles west-north-westward of Wai-tiao shan. It divides Ts'e-tzu shui-tao into T'ao-yao men (Ketsu pass) and Hsi-hou men (Blackwall pass), which are described below.

Anchorage.—There is anchorage in moderate depths, and out of the strong tidal streams, anywhere within one mile of the flat extending from the coast of Chou shan between Yang-lo chiao and Wai-tiao shan.

Tolerably good anchorage, comparatively free from the strong tidal streams, can be obtained off the southern coast of Ts'e-tzu shan, in depths of from 9 to 15 fathoms (16^m5 to 27^m4), with the 924-foot (281^m6) peak in the northern part of Chin-t'ang shan in line with Lao-hu shan (Rondo), an islet lying about 2 cables off the south-western point of Ts'e-tzu shan, bearing 274° ; it is necessary to moor to avoid fouling the anchor.

There is also anchorage off the eastern coast of Chin-t'ang shan, north-eastward of Hsien-jen shan, in depths of from 8 to 10 fathoms (14^m6 to 18^m3). This anchorage is somewhat protected from the tidal streams by the rocky north-eastern point of Chin-t'ang shan ; vessels must moor with the anchors parallel to the coast, and the western point of Ts'e-tzu shan must not be open eastward of the above rocky point.

40 **T'ao-yao men and Hsi-hou men.**—**Islands and dangers.**—T'ao-yao men (Ketsu pass) lies between the northern part of the western coast of Chou shan and Ts'e-tzu shan ; on the eastern side of the pass are the four islands Wai-tiao shan (which has been described with Ts'e-tzu shui-tao), Chung-tiao shan (Lin), 231 feet (70^m4) high ; Li-tiao shan (Latea), 377 feet (114^m9) high ; and Ku-tz'u shan (Ketsu), 282 feet (85^m9) high.

An islet 48 feet (14^m6) high, lies about 2 cables westward of the southern point of Ku-tz'u shan, and a shoal, with a depth of 3 fathoms (5^m5) over it, extends about one cable westward from this islet. 50 T'ao-yao men is a good ship channel, about 3 cables wide in its narrowest part, between the western point of Ku-tz'u shan and the eastern coast of Ts'e-tzu shan, and it is free from violent overfalls ; there is also a deep passage eastward of Ku-tz'u shan, but it should not be used without local knowledge.

Charts 1124, 1199, 2412, 1262, 1263.

Chart 1124.

Maum shan, situated on the eastern side of the northern entrance to Ku-tz'u men, and Wu hsü, have been described on page 318.

Chart 1429.

Hsi-hou men (Blackwall pass), situated between the south-western 5 coast of Ts'e-tzu shan and the northern end of Chin-t'ang shan, has general depths of over 20 fathoms (36^m6), but the bottom is rocky and very uneven. A 7-fathom (12^m8) patch lies about 6 cables, southward of Lao-hu shan (Rondo), an islet 98 feet (29^m9) high, lying off the south-western point of Ts'e-tzu shan, and a 6-fathom 10 (11^m0) patch lies about three-quarters of a mile west-north-westward of that islet; there are also two 9-fathom (16^m5) patches in this vicinity. A rock, 17 feet (5^m2) high, lies nearly one mile northward of Lao-hu shan. Wan-chan shan (Goulin rock), with a depth of 6 feet (1^m8) over it, lies about 3 cables south-eastward of the north- 15 eastern point of Chin-t'ang shan. A rock, which dries 11 feet (3^m4), lies about half a cable southward of the western point of T'se-tzu shan, and the tidal streams are very rapid around it. A mud bank, with depths of less than 3 fathoms (5^m5) over it, extends about three-quarters of a mile north-westward from Ts'e-tzu shan; on it lies a 20 rock, 67 feet (20^m4) high.

The north-eastern coast of Chin-t'ang shan, forming the western side of Hsi-hou men, is indented by three bays, all filled with mud flats. Heng-t'ang shan (Leang), 144 feet (44^m9) high, situated about a quarter of a mile off the northern point of Chin-t'ang shan, is steep- 25 to on its eastern side; Yü-lung shan (Chocho), 348 feet (106^m1) high, lies about one mile west-north-westward of Heng-t'ang shan, and is almost connected to it by a bank with depths of less than 3 fathoms (5^m5) over it. Ta-ts'ai-hua shan (Fangshi), situated about a quarter of a mile northward of Yü-lung shan, has a sharp summit, 471 feet 30 (143^m6) high; a mud bank, with a depth of 2 fathoms (3^m7) over its outer part, extends about half a mile north-westward from the island. An islet, 60 feet (18^m3) high, lies about 2 cables eastward of the northern part of Ta-ts'ai-hua shan (chart 1199).

Light.—A light, privately maintained, is exhibited, at an elevation 35 of 119 feet (36^m3), from a stone tower over a dwelling, 20 feet (6^m1) in height, on the north-eastern side of Ta-ts'ai-hua shan.

Tidal streams.—In Hsi-hou men the tidal streams run north-westward from 3½ hours before until 2½ hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and 40 south-eastward from 2½ hours after high water until 3½ hours before the next high water; there is scarcely any slack water at spring tides. The rate varies from 3 to 8 knots, according to the age of the moon. A continuance of heavy rain, causing a freshet in Ch'ien-t'ang Chiang (Tsien-tang kiang) page 355), checks the stream setting 45 north-westward and considerably accelerates that setting south-eastward.

The tidal streams whirl and race violently over the shoaler places, and with northerly gales there are high overfalls when the stream is setting south-eastward. In north-westerly gales there is a very 50 severe race with high breaking seas over the shoal spots westward of Lao-hu shan (*Lat.* 30° 04' N., *Long.* 121° 55' E.) when the stream is setting north-westward.

Chin-t'ang yang.—Islets and dangers.—Beacons.—Chin-t'ang yang

Charts 1124, 1199, 2412, 1262, 1263.

Chart 1429.

(Kin-tang channel) is situated between Ta-hsieh shan (page 321) and the coast of the mainland westward of it, on the south, and Chin-t'ang shan, on the north. The southern side of the channel, between the
 5 western entrance point of Ta-hsieh-shan chiang and Suan-shan t'ou or Ko point, lying nearly 8 miles west-north-westward, is fronted by an extensive mud bank which dries out fully one mile in places. Two prominent rocks, 8 feet (14^m6) and 52 feet (15^m8) high, lie on the edge of this mud bank about 1½ and 2 miles, respectively, west-
 10 ward of the entrance to Ta-hsieh-shan chiang. San shan (Sam-san islets), from 67 to 90 feet (20^m4 to 27^m4) high, lie on the mud bank about midway between the entrance to Ta-hsieh-shan chiang and Suan-shan t'ou; a creek through the mud along the western side of these islets leads to the town of Pei-ch'i-tao or Heng-p'u (Sin-chi-tau).
 15 A rock, 12 feet (3^m7) high, lies close inshore about three-quarters of a mile south-eastward of Suan-shan t'ou.

Huang-niu chiao (Just-in-the-way), situated about 2 miles eastward of O-yü chiao (Alligator point), the southern point of Chin-t'ang shan, and nearly in mid-channel, is a black, rugged rock 16 feet (4^m9) high;
 20 a rock, which dries 2 feet (0^m6), lies close southward of it.

Shuang chiao (Alligator reef), lying about 1½ cables southward of O-yü chiao, is awash at high water and is marked by a red stone beacon. A 9-fathom (16^m5) patch lies about 1½ miles west-south-westward of O-yü chiao, and there are heavy tide-rips in its vicinity at
 25 spring tides.

Ch'ang-pi tsui (Long Nose point) lies about three-quarters of a mile west-north-westward of O-yü chiao, and Creek point about 1½ miles north-north-westward of Ch'ang-pi tsui.

Several islets and rocks lie on the southern side of the western
 30 entrance to Chin-t'ang yang. Huang-mang shan (Wang-mei san), 247 feet (75^m3) high, the largest of these islets, lies about half a mile north-eastward of Suan-shan t'ou, and being covered with grass, is of a light colour; a bank, with two rocks on its north-eastern edge, the outer 27 feet (8^m2) high, extends about 2 cables eastward from
 35 this islet. A shoal, with three rocky islets, from 40 to 111 feet (12^m2 to 33^m8) high, on its outer edge, extends nearly a quarter of a mile north-westward from Huang-mang shan. O chiao (Blonde rock), situated about 4 cables north-north-westward of the northern point of Huang-mang shan, dries 6 feet (1^m8) and is marked by a black
 40 spar beacon surmounted by a daymark; this beacon was not observed in 1935. An isolated 10-fathom (18^m3) patch lies about 3 cables north-eastward of O chiao. (*Lat. 29° 59' N., Long. 121° 48' E.*).

Chungmenchu (Ka-mun) is an islet, 118 feet (36^m0) high, situated about a quarter of a mile northward of Suan-shan t'ou, with foul
 45 ground between; Ko men, lying between this islet and Huang-mang shan, is a deep and clear passage, except for an 8-fathom (14^m6) patch lying about 1½ cables northward of Chungmenchu. There is a 10-fathom (18^m3) patch about half a mile westward of Chungmenchu.

There is a small rocky promontory about one mile westward of
 50 Suan-shan t'ou, the bay between being filled with a mud flat; a rock, with a depth of less than 6 feet (1^m8) over it, lies about 2 cables north-north-westward of this promontory.

Chart 1592.

Ch'ang-t'iao tsui (Chang-tu point), situated about half a mile

Charts 1199, 2412, 1262, 1263.

Chart 1592.

further westward, is a black, rocky promontory rising to an elevation of 113 feet (34^m4) ; about midway between these two promontories is a rock 11 feet (3^m4) high, and between this rock and Ch'ang-t'iao tsui are two rocks close together, which dry 7 feet (2^m1). 5

Yung chiang is described on page 346.

Chart 1429.

Light.—A light is exhibited from Huang-mang shan.

Islands and dangers off the north-western side of Chin-t'ang shan.—

T'ai-p'ing shan (Ta-ping) is a hilly island, 532 feet (162^m1) high, lying 10 close off the north-western side of Chin-t'ang shan. Tao-ch'u shan (Ta-utze island), 105 feet (32^m0) high, lies on the outer end of a spit, with depths of less than 3 fathoms (5^m5) over it, which extends nearly 1½ miles southward from T'ai-p'ing shan ; its southern end is about one mile north-north-westward of Mu-ao-fou t'ou, a point on the western side of Chin-t'ang shan. Kan-ch'ih (Tap islet), 116 feet (35^m4) high, lies about 2 cables northward of the north-western point of T'ai-p'ing shan ; a spit, with depths of less than 3 fathoms (5^m5) over it, extends about half a mile northward from this islet. 15

Ta-t'iao-kuo shan (Shuntin), 239 feet (72^m8) high, lies nearly one 20 mile north-eastward of Kan-ch'ih (*Lat.* 30° 05' N., *Long.* 121° 49' E.). An islet, 173 feet (52^m7) high, lies about a quarter of a mile eastward of Ta-t'iao-kuo shan and is almost connected to Yü-lung shan ; the latter island, with Heng-t'ang shan and Ta-ts'ai-hua shan, has been described with Hsi-hou men on page 325. 25

Light.—A light is exhibited, at an elevation of 280 feet (85^m3), from a white tower over a white building, 30 feet (9^m1) in height, situated on a hill on the north-western extremity of T'ai-p'ing shan. This light was extinguished, in 1940.

Tao-ch'u chiang.—**Anchorage.**—**Tidal streams.**—Tao-ch'u chiang 30 (Ta-utze harbour) is formed by the narrow channel separating Tao-ch'u shan and T'ai-p'ing shan from the coast of Chin-t'ang shan, and is available as an anchorage for small vessels with local knowledge in a typhoon. There are depths of from 3½ to 5½ fathoms (5^m9 to 10^m5) in mid-channel in the southern part of the harbour, as far northward 35 as the eastern point of T'ai-p'ing shan, where the channel is obstructed by a ridge of rocks ; the northern entrance to the harbour is shoal.

There is room for several vessels drawing not more than 16 feet (4^m9), but it is necessary to moor ; the tidal streams attain a rate of 40 3 knots, and at spring tides there are numerous eddies in the harbour, when the surging of a vessel at her moorings somewhat strains the cables.

Charts 1395, 1429.

TING-HAI CHIANG AND APPROACHES.—**General remarks.**— 45
Beacon.—Ting-hai chiang (harbour), situated off the southern coast of Chou shan, can be reached by various channels between the numerous islands lying off this coast. The safest and best route, which is recommended for large vessels, is through Pai-ya yang (page 323), thence through Ma-ch'in shui-tao (Haji-ko), the channel 50 between Hsieh hsü (Si-ha-ji) and P'an hsü shan (Bun-ji), and thence through Pei-p'an-hsü shui-tao (North Bun-ji channel) as shown by pecked line on chart 1395.

Charts 1124, 1199, 2412, 1262, 1263.

Charts 1395, 1429.

Melville channel, entered from southward between Chai-jo shan (Tsen-yo san) and Pi-chia shan (Hang-fu san), is a direct route to Ting-hai chiang for vessels approaching from southward, but it is not recommended for large vessels, or vessels of low power, as there are several dangers in the northern part, with narrow passages between, and the rapid tidal streams form eddies that at times render a vessel unmanageable.

Shen-chia shui-tao (Sinkea channel) is an inshore passage along the southern coast of Chou shan for small vessels not exceeding 10 feet (3^m0) in draught, proceeding between Shen-chia-men (page 315) and Ting-hai. A stone beacon stands on Lao-tio, a rock which dries 6 feet (1^m8), situated in the western entrance of this passage. Local knowledge is essential for the navigation of this narrow passage, in which are some rocks which dry, and no further description of it will be given.

Islands and dangers eastward of Melville channel.—Beacon.—Tidal streams.—Ao shan (san) lies with its southern extremity nearly 3 miles north-eastward of Pei-ch'i-t'ou chiao (*Lat.* 29° 55' N., *Long.* 122° 07' E.), and has a noticeable peak, 412 feet (125^m6) high, in its south-western part. A spit, with depths of less than 3 fathoms (5^m5) over it, extends nearly one mile eastward from the south-eastern side of the island. The southern point of the island is steep-to, but the south-western side of the island is fringed by a bank which dries; three rocks, 72, 8 and 12 feet (21^m9, 2^m4, and 3^m7) high, respectively, lie within a distance of 3 cables southward of the south-western point. Kun-hi, a rock 63 feet (19^m2) high, lies about 6 cables westward of the south-western point of Ao shan; it is deep within half a cable of the eastern side of this rock, but there are depths of less than 5 fathoms (9^m1) for a quarter of a mile westward of it.

Ch'ang-chih shan (Jan-ji), 350 feet (106^m7) high, lies about 4 cables northward of Ao shan, and a mud flat, on which are Ma-an shan (Mundu-san), 234 feet (71^m3) high, and two other islets, extends about 2½ miles south-eastward from it. Several rocky islets lie off the north-western side of Ch'ang-chih shan, including Tung-p'an hsü, 182 feet (55^m5) high.

Chart 1395.

Sung shan (san), 280 feet (85^m3) high, lies about 2 cables north-westward of Ao shan. Sung-shan-tio (Sung-san-tio), situated about one cable southward of the south-western point of Sung shan is a rocky ledge, which dries 6 feet (1^m8), with a stone beacon on it; another rocky ledge, which dries 4 feet (1^m2), lies close southward of Sung-shan-tio. Ta-k'o shan (Ko san), lying about 2 cables northward of Sung shan, is 70 feet (21^m3) high and covered with small fir trees; a drying ledge, with a rock above water on its outer end, extends about one cable southward from Ta-k'o shan. Feng-huang shan (Fang-wo san), 60 feet (18^m3) high, lies about 2 cables northward of Ta-k'o shan, and there is a rock 3 feet (0^m9) high, and a rock which dries 3 feet (0^m9), between these two islets. The channel between these islands and the eastern side of Ta-ch'u shan (Sio-ju), described below, is deep in the fairway, but it is barely one cable wide in places, and the tidal streams attain a rate of from 3 to 5 knots; it should not be used for navigation.

Tong-ha-ji, an islet 20 feet (6^m1) high, lies about 3 cables northward of Feng-huang shan, on the southern side of Shen-chia shui-tao.

Charts 1199, 2412, 1262, 1263.

Chart 1395.

Meikle rock, with a depth of $2\frac{1}{2}$ fathoms (4^m1) over it, lies about $3\frac{1}{2}$ cables westward of Lao-tio, which was described on page 328.

Melville channel.—Islands and dangers.—Pi-chia shan (Hang-fu san), situated on the eastern side of the southern entrance to Melville channel, lies about one mile westward of the south-western point of Ao shan, and has a hill, 130 feet (39^m6) high, at its northern end. Two 9-fathom (16^m5) patches are situated, respectively, about $2\frac{1}{2}$ cables westward and 6 cables west-north-westward of Pi-chia shan.

Chai-jo shan (Tsen-yo san), a large island situated on the western side of the entrance and about $1\frac{1}{2}$ miles westward of Pi-chia shan, has a rocky, precipitous hill, 700 feet (213^m4) high, on its southern part; the highest part of the island, 865 feet (263^m6) high, is in about the middle. A flat extends from the eastern side of Chai-jo shan, completely filling the bight northward of Trunk point (chart 1429), the eastern extremity of the island. A depth of $6\frac{1}{2}$ fathoms (11^m9) lies about $1\frac{1}{2}$ cables off the north-eastern corner of Chai-jo shan (*Lat.* $29^\circ 58' N.$, *Long.* $122^\circ 05' E.$).

Yen tao (Sio-dun-chi), situated about 4 cables north-eastward of the north-eastern point of Chai-jo shan, is an islet, 50 feet (15^m2) high, situated on the western side of the fairway. Pa-ting tao (To-dun-chi san) lies with its southern extremity about 3 cables north-westward of Yen tao; Harry peak, the summit of the island, is a conical hill, 245 feet (74^m7) high. Duck rocks lie about one cable south-westward of Pa-ting tao and are about one foot (0^m3) high. Lien-chih shan (Ling-ju san) lies close off the northern end of Pa-ting tao. Kan shan (To-king san), 85 feet (25^m9) high, lies nearly 2 cables north-eastward of the northern extremity of Pa-ting tao. The Ledge, a reef which dries 2 feet (0^m6) at its outer end, extends about one cable eastward from the eastern point of Kan shan, and the tidal streams set rapidly across it as soon as it is covered. A reef extends about three-quarters of a cable northward from the northern end of the island, and on the outer end of this reef is Cap, a rock 16 feet (4^m9) high. Black rock, situated about $1\frac{1}{2}$ cables north-eastward of Kan shan, lies on the middle of a reef and is 2 feet (0^m6) high. All these islands and reefs are on the western side of Melville channel.

Melville rock, with a least depth of $1\frac{1}{2}$ fathoms (2^m7) over it, lies nearly 3 cables eastward of the eastern point of Kan shan, and on the eastern side of the main route through Melville channel. Dundas rock, also on the eastern side of this channel, lies about 2 cables northward of Melville rock and has a least depth of one fathom (1^m8) over it.

Ta-ch'u shan (Sio ju) lies with Ta-hsü chiao (Deer point), its south-western extremity, about 6 cables eastward of Yen tao; in the middle of the island are three rounded summits, the northernmost and highest being 670 feet (204^m2) high. Mu shan (san) and another islet, 27 feet (8^m2) high, lie on a mud flat close off the southern side of Ta-ch'u shan and almost connected to Ta-hsü chiao. Stone walls are built between the points of the bays around Ta-ch'u shan, and the land reclaimed within them is cultivated.

Sa-a tao (Sarah island), 60 feet (18^m3) high, and Ta-kuei tao (To-ju), 125 feet (38^m1) high, lie together on a mud flat which is separated from the north-western side of Ta-ch'u shan by Ta-ch'u shui-tao (Deer Island channel), which is a branch of Melville channel. A

Charts 1429, 1199, 2412, 1262, 1263.

Chart 1395.

10-fathom (18^m3) patch lies in the middle of the southern entrance to Ta-ch'ü shui-tao, and Elliot patch, with a least depth of 3½ fathoms (5^m9) over it, lies in the middle of the narrowest part of this channel, between Ta-kuei tao and the north-western point of Ta-ch'ü shan. Yeh-chu chiao (Tsing-tio), a small rock which dries one foot (0^m3), lies about a quarter of a mile north-eastward of Ta-kuei tao, with a shoal, with a least depth of 6½ fathoms (11^m9) over it, and a 9-fathom (16^m5) patch, between. A 1½-fathom (2^m7) patch lies about one cable east-north-eastward of Yeh-chu chiao, and a bank, with a least depth of 5½ fathoms (10^m1) over it in a position about 2 cables east-south-eastward of Yeh-chu chiao, extends off the northern side of Ta-ch'ü shan.

Tidal streams.—The tidal streams between Ta-ch'ü shan and Pa-ting tao run northward from 3 hours before until 2½ hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and southward from 2½ hours after high water until 3 hours before the next high water, both streams attaining a rate of from 3 to 5 knots.

Between Kan shan and Sa-a tao the tidal streams swirl around Melville and Dundas rocks, and attain a rate of from 3 to 5 knots; this channel is more difficult to navigate than Ta-ch'ü shui-tao, although the tidal streams are also strong in the latter.

Islands and dangers between Melville channel and Ma-ch'in shui-tao.—**Nan-p'an-hsü shui-tao.**—**Tidal streams.**—Hsiao-chai-jo shan (Sio-tsen-ya), separated from the northern side of Chai-jo shan by a channel about one cable wide, has a hill on its southern part 223 feet (68^m0) high. Rip rock lies about 1½ cables north-eastward of the northern point of Hsiao-chai-jo shan and is awash. Kao shan (san) and Pe shan (san) are two islets lying together on a reef; Kao shan lies about 1½ cables northward of Hsiao-chai-jo shan; Pe shan is 20 feet (6^m1) high. Fury rock (*Lat.* 29° 58' N., *Long.* 122° 05' E.) with a depth of 1½ fathoms (3^m2) over it, lies about 2½ cables west-south-westward of Kao shan, and there are irregular depths of from 4½ to 10 fathoms (8^m2 to 18^m3) between.

T'zu shan (To-tzu san), is 260 feet (79^m2) high and lies with its southern extremity about 2 cables westward of the north-western point of Chai-jo shan. Hecla rocks, which dry 10 feet (3^m0), lie off the middle of the eastern coast of T'zu shan and are connected to it by shoal water.

Liao-p'eng shan (Lio-mang), 210 feet (64^m0) high; Liang-men (Sio-mau), 160 feet (48^m8) high; and Hsiao-mao shan (Jau) (chart 1429), 409 feet (124^m7) high; are three islands lying south-westward of T'zu shan, and between Chai-jo shan and Ta-mao shan (page 331).

P'an-hsü shan (Bun-ji) is a large island lying with its southern extremity about 6 cables northward of T'zu shan; a range of hills, rising to an elevation of 520 feet (158^m5) in the northern part, runs through the island from northward to southward. There are paddy fields along the eastern side of the island, and salt-pans on the mud where it only covers at high water spring tides.

Hsiao-p'an hsü (Sio-bun-ji) is 220 feet (67^m1) high and the largest of five islands lying off the south-eastern coast of P'an-hsü shan, with a narrow channel, available for boats, between: the other islands are Lau-chi shan (san), 30 feet (9^m1) high; Man-t'ou shan (Mun-du-san), 90 feet (27^m4) high; Wang-chia shan (Wong-ko san)

Charts 1429, 1199, 2412, 1262, 1263.

Chart 1395.

340 feet (103^m6) high ; and Ho-shang shan (O-zo san), 90 feet (27^m4) high. Nan-p'an-hsü shui-tao (South Bun-ji channel) is situated between these islands on its north-western side, and T'zu shan and the chain of islands which extend north-eastward to Sa-a tao on its south-eastern side. This channel should not be used, as Davy rock, with a depth of 1½ fathoms (2^m7) over it, lies in the middle of the south-western entrance and about 2 cables northward of the north-western point of T'zu shan, whilst the channel is narrowed to a width of about half a cable between the south-eastern point of Hsiao-p'an hsü and Cap ; Eddy rock, with a depth of one fathom (1^m8) over it, lies off the southern point of Hsiao-p'an hsü. The tidal streams in this channel attain a rate of from 3 to 5 knots.

Western approach to Ting-hai chiang.—Islands and dangers.—Anchorage.—Ma-ch'in shui-tao.—Pei-p'an-hsü shui-tao.—Ta-mao shan (Ta mau), a large island situated on the south-eastern side of the western approach to Ting-hai chiang, rises to its highest peak in Tower hill (*Lat.* 29° 57' N., *Long.* 122° 02' E.), 1,075 feet (327^m7) high, situated in about the middle of the island. A bank extends from the north-western side of the island, and there are depths of less than 5 fathoms (9^m1) for about 3 cables outside the line joining Long-ka point, the northern point of the island, and Pao-uti point the north-western point.

Chart 1429.

Ta-mao chiao (Ta-mau point) is the southern extremity of Ta-mao shan.

Chart 1395.

Ma-ch'in shui-tao or Bell channel (Haji-ko) is a clear and deep channel between the western side of P'an-hsü shan and Hsieh hsü (Si-ha-ji), an island 305 feet (93^m0) high, situated about three quarters of a mile westward.

Ta-huang-cha-pan shan (Ta-wan-ja-pan), 75 feet (22^m9) high, lies on the eastern side of this channel and about one cable westward of the southern extremity of P'an-hsü shan ; a rock, with a depth of less than 6 feet (1^m8) over it, lies about 1½ cables south-south-eastward of the southern point of Ta-huang-cha-pan shan. A conspicuous joss house stands on the western coast of P'an-hsü shan about midway between the northern and southern extremities of the island. P'ai-k'eng chiao (Pakan point) lies about 4 cables south-westward of Kuo-ch'in chiao (Tiang-tio-chu point), the northern extremity of P'an-hsü shan.

Ma-du-san is an islet, 51 feet (15^m5) high, lying close off the north-eastern end of Hsieh hsü.

There is good anchorage between P'an-hsü shan and Hsieh hsü, in depths of from 11 to 12 fathoms (20^m1 to 21^m9), mud, towards the eastern side of the channel, where the tidal streams are not so strong and run more regularly. In 1932, H.M.S. *Cornwall* anchored 7½ cables 121° and 5½ cables 072°, respectively, from Kua-fu-yen (Kwo-wu-tio) beacon (*see below*) ; in the former position the holding ground, stiff mud and shells, was good, but both anchorages were uncomfortable and the tidal streams were strong.

Pei-p'an-hsü shui-tao (North Bun-ji channel) lies between P'an-hsü shan and the southern coast of Chou shan, which is described on page 332. For directions *see* page 333.

Charts 1199, 2412, 1262, 1263.

Chart 1395.

Tidal streams.—Between Ta-mao shan and Hsieh hsü the tidal streams set westward from about 3 hours before until $2\frac{1}{2}$ hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and eastward from $2\frac{1}{2}$ hours after high water until 3 hours before the next high water; the maximum rate is from 2 to 3 knots.

North-eastward of P'an-hsü shan the tidal streams set north-westward from about 3 hours before until $2\frac{1}{2}$ hours after high water at Yangtze approaches, and south-eastward from about $2\frac{1}{2}$ hours after high water until 3 hours before the next high water; the maximum rate of both streams is from 2 to 3 knots.

Southern coast of Chou shan.—Islands and dangers.—Anchorage.—

Beacon.—**Tidal streams.**—Yang-lo shan (Yang-lo-i san), lying about 2 cables southward of Yang-lo chiao, the south-western point of Chou shan, is a rocky island, 100 feet (30^m5) high, covered with grass. Su-ji san, 62 feet (18^m9) high, lies about 4 cables eastward of Yang-lo chiao. Ssu-ch'i shan (Ching-du san), 84 feet (25^m6) high, lies about 6 cables eastward of Yang-lo chiao and $1\frac{1}{2}$ cables offshore; O-ki shan (san), 30 feet (9^m1) high, lies about one cable north-eastward of Ssu-ch'i shan. Lo-t'ou men (Lo-i-dur-mang), the channel between these two islands and Hsieh hsü, should not be used by vessels without local knowledge, as the swirl of the tidal streams may set a vessel on to the rocks in the channel. A narrow shoal, with a least depth of one fathom (1^m8) over it, extends about one cable northward from a position about one cable northward of the northern point of Hsieh hsü. Kua-fu yen (Kwo-wu-tio) is a rocky patch lying about 3 cables northward of the northern point of Hsieh hsü, and it is marked by a stone beacon. The local steam vessels always use Lo-t'ou men, passing fairly close to the south-eastern point of Ssu-ch'i shan, and thence northward of Kua-fu yen and through Pei-p'an-hsü shui-tao.

In Lo-t'ou men the tidal streams set south-westward from about 3 hours before until $2\frac{1}{2}$ hours after high water, and north-eastward from $2\frac{1}{2}$ hours after high water until 3 hours before the next high water; the rate of both streams is from 2 to 5 knots.

Lao-ki point (*Lat.* $30^\circ 00' N.$, *Long.* $122^\circ 03' E.$) is situated about $4\frac{1}{2}$ cables north-eastward of O-ki shan. Between Lao-ki point and Fort Ding-yuen, situated about $1\frac{1}{2}$ miles east-north-eastward, the coast recedes. A-dan-san, situated nearly 3 cables north-north-eastward of Lao-ki point and about one cable offshore, is an islet, 35 feet (10^m7) high, surrounded by a reef.

Nab rock, with a depth of $1\frac{1}{2}$ fathoms (3^m2) over it, lies about 2 cables offshore about three-quarters of a mile westward of Fort Ding-yuen, and $4\frac{1}{2}$ cables north-north-westward of Kuo-ch'in chiao (page 331); there are two forts on the coast northward of Nab rock. A rock, with a depth of $1\frac{1}{2}$ fathoms (2^m3) over it, lies about $1\frac{1}{2}$ cables offshore about half a mile eastward of Nab rock. Chu shan (Sio-chusan), 70 feet (21^m3) high, is an island almost connected to the coast of Chou shan abreast Fort Ding-yuen. Anchorage can be obtained between Nab rock and Chu shan, in depths of from 16 to 17 fathoms (29^m3 to 31^m1), but it is not recommended, as the tidal streams and eddies are strong.

Ting-hai chiang.—**Islands and dangers.**—**Beacons.**—Hsiao-wu-k'uei shan (Sio-wu-kwe san), an island 170 feet (51^m8) high, lies about

Chart 1395.

7 cables south-eastward of Chu shan. Wu-k'uei shan (Wu-kwe san), a wooded island, 265 feet (80^m8) high, lies north-eastward of Hsiao-wu-k'uei shan and is separated from it by Ko-lo men (man), a narrow channel with depths of from 4 to 7 fathoms (7^m3 to 12^m8) in the fairway. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about 2½ cables eastward and 3½ cables south-eastward from Wu-k'uei shan; Lao-shu chiao (Grave islet), 40 feet (12^m2) high, lies on the north-eastern part of this bank. There is a least depth of 3½ fathoms (6^m9) between this bank and the coast of Chou shan eastward, and this channel is the eastern entrance to Ting-hai chiang. 6 10

Middle ground, with a least depth of a quarter of a fathom (0^m5) over it, lies in the western entrance to Ting-hai chiang. There is a deep channel, about one cable wide, between Middle ground and Chu shan; the channel eastward of Middle ground, between it and Hsiao-wu-k'uei shan and Wu-k'uei shan, is about 1½ cables wide, and is also deep. 15

Ting-hai chiang (harbour), situated northward of Wu-k'uei shan and eastward of Middle ground, has general depths of from 3 to 8 fathoms (5^m5 to 14^m6). There are several shoals, with depths of from 1½ to 2½ fathoms (2^m3 to 4^m1) over them, in the eastern part of the harbour. Parry rock (*Lat.* 30° 00' N., *Long.* 122° 06' E.), which dries 4 feet (1^m2), lies about 1½ cables northward of Lao-shu chiao; there is a deep channel, about half a cable wide, between this rock and the coast of Chou shan. 25

Ch'ing-lei-t'ai, or Beacon hill, 600 feet (182^m9) high, and surmounted by three beacons, lies on the mainland about one mile east-south-eastward of Lao-shu chiao, and is a useful mark in this vicinity.

Anchorage.—Landing.—The outer anchorage, for large vessels, is northward of Yeh-chu chiao (page 330), in a depth of about 12 fathoms (21^m9), with Cap in line with the north-western side of Sa-a tao, bearing 228°, and Lao-shu chiao bearing 332°; in this position the tidal streams are fairly steady in direction, and there are but few eddies. South-eastward of Hsiao-wu-k'uei shan the bottom is very uneven, and there are heavy swirls and eddies. 35

The best anchorage in Ting-hai chiang is south-westward of Joss hill, a conspicuous hill situated on the coast of Chou shan north-north-westward of Parry rock, in a depth of 6 fathoms (11^m0), mud, with Lao-shu chiao bearing 130°, and the western point of Hsiao-wu-k'uei shan bearing about 214° and just open of the north-western point of Wu-k'uei shan; this anchorage is occasionally encumbered by junks, although they usually anchor between Middle ground and Chou shan. The tidal streams and eddies are very strong, and it is therefore, necessary to moor. There is a floating pontoon landing place at the eastern end of the town. 45

Charts 1395, 1429.

Directions.—A vessel using the western approach to Ting-hai chiang should keep in mid-channel through Pai-ya yang and pass about 6 cables north-westward of Ta-mao shan, thence following the track indicated by a pecked line on chart 1395. 60

If proceeding to the inner anchorage, a vessel should pass south-eastward of Middle ground, and about one cable north-westward of Hsiao-wu-k'uei shan and Wu-k'uei shan, but when the tidal stream is

Charts 1199, 2412, 1262, 1263.

Charts 1395, 1429.

setting south-eastward they must guard against being set on to the western extremity of Hsiao-wu-k'uei shan.

To enter Ting-hai chiang by the eastern entrance a north-north-westerly course should be steered from the outer anchorage, so as to pass about one cable eastward of Lao-shu chiao (*Lat.* $30^{\circ} 00' N.$, *Long.* $122^{\circ} 06' E.$), taking care to avoid the bank extending south-eastward from Wu-k'uei shan; thence steer a mid-channel course between Parry rock and the coast of Chou shan, and then alter course westward for the anchorage.

If using Melville channel it is preferable to enter with the north-going stream. From abreast Roundabout island (page 321) a north-westerly course may be steered for the entrance of the channel; thence pass fairly close eastward of Yen tao, and bring Trunk point in line with the eastern side of this islet, bearing 184° astern, which leads between The Ledge and Melville rocks, and between Black rock and Dundas rock. When past Sa-a tao the outer or inner anchorage can be steered for as previously directed.

If using Ta-ch'u shui-tao, a vessel should keep towards the Ta-ch'u shan side of the channel so as to avoid Melville rock and the mud flat extending south-eastward from Sa-a tao. There is no leading mark for clearing Elliot patch; the channel south-eastward of it is wider and deeper than that north-westward. Yeh-chu chiao may be passed on either side, bearing in mind that a $1\frac{1}{2}$ -fathom (2^m7) patch lies about one cable east-north-eastward of this rock.

Chart 1395.

Ting-hai.—Ting-hai is a walled city, with a population of about 40,000. A canal about 33 feet (10^m1) wide, with depths of from 3 to 5 feet (0^m9 to 1^m5), almost encircles the city and enters it near the southern gate, which is about half a mile from the shore of the harbour; the principal gate is at the south-western corner. Canals form the principal means of transport in this neighbourhood. An embankment, 20 feet (6^m1) high, prevents the encroachment of the sea on the rice fields within the coast.

Chart 1124.

NORTHERN GROUP OF CHOU-SHAN CH'ÜN-TAO.—General remarks.—The northern group of Chou-shan ch'ün-tao includes the chain of islands which extends nearly 50 miles westward from Tung-fu shan (Video), the easternmost island of the archipelago, and terminates in Yü-hsing-nao (West Volcano island).

The eastern part of the channel between the northern and southern groups is called Huang-ta yang, and the western part Hui-pieh yang.

Tung-fu shan.—Anchorages.—Tung-fu shan, the easternmost island of Chou-shan ch'ün-tao, lies about 16 miles east-north-eastward of Wai-huo hsü (page 314); it is 1,076 feet (328^m0) high and an excellent landmark, and is the best island of the group to make from southward, as it is very steep on that side. The island is covered with boulders of porphyritic rock, interspersed with grass. The eastern point rises in vertical cliffs to an elevation of from 300 to 500 feet (91^m4 to 152^m4), and there are three remarkable craggy peaks on the ridge which connects it to the summit. On the northern side of the island there is a prominent dome-shaped white patch on the

Charts 1199, 2412, 1262, 1263.



Summit, bearing 351°, distant 4 miles.

Tung-fu shan (Video) from southward.
(Original dated 1888).

Chart 1124.

rocks, which may sometimes be discerned through mist on sunny days. *See* view facing this page.

Several rocks lie close to the coast around the island. Piggott rock (island) (*Lat.* 30° 08' N., *Long.* 122° 45' E.), off the western coast, is 5 77 feet (23^m5) high; the Twins, 26 and 30 feet (7^m9 and 9^m1) high, respectively, lie off the north-eastern point.

There is a small fishing population. The principal landing place, used by the fishing boats, is a small cove situated between two off-lying rocks at the north-western extremity of the island, where there 10 is a small village; there is also a village at the head of a bay on the northern side of the island.

There is open anchorage for vessels with local knowledge off the south-western coast of Tung-fu shan, in depths of from 13 to 17 fathoms (23^m8 to 31^m1), sheltered from northerly and easterly winds; 15 this anchorage should be approached with the summit of the island bearing 057°, anchoring when the summit of Ch'ing-peng tao (East Fisherman island), described below, is in line with Piggott rock, bearing 327°.

There is also open anchorage for vessels with local knowledge off 20 the northern coast of Tung-fu shan, in depths of from 11 to 14 fathoms (20^m1 to 25^m6), mud and shells, sheltered from southward and south-westward, but unsafe with northerly winds. This anchorage should be approached with the summit of the island bearing 177°, anchoring when the southern rock of Li-shuai shan (*see* below) is in line with the 25 northern Twin, bearing about 079°; in this locality the depths increase gradually to a distance of 3 cables offshore, and then increase suddenly to 27 fathoms (49^m4).

Off-lying rocks.—Li-shuai shan (Four Sisters) consists of a group of four rocks, about 30 feet (9^m1) high, the south-western of which lies 30 about 4½ miles east-north-eastward of the eastern point of Tung-fu shan. Submerged rocks, with breakers in the vicinity and surrounded by muddy yellow water, were, in 1945, reported to exist 3½ cables east-south-eastward of the largest rock.

Wai-shuai shan (Two Brothers), situated about 3½ miles eastward 35 of Li-shuai shan, consists of two rocks about 100 feet (30^m5) high.

Chung-chieh-shan lieh-tao.—**Anchorage.**—**Tidal streams.**—Chung-chieh-shan lieh-tao (Fisherman islands), the nearest group to Tung-fu shan, consists of four principal islands, with many islets and rocks. Hsi-fu shan (South Fisherman island), the south-eastern island, is 40 382 feet (116^m4) high and lies about 2½ miles north-westward of Tung-fu shan, with a deep passage between; *see* table of tidal streams on chart 1124. All the islands of this group are rocky, precipitous, and covered with grass; they are inhabited, except Hsi-fu shan. 45

Carles islet, 195 feet (59^m4) high, with a number of rocks around, lies about midway between Hsi-fu shan (*Lat.* 30° 11' N., *Long.* 122° 43' E.) and Ch'ing-peng tao (East Fisherman island), which is 438 feet (133^m5) high and lies north-north-westward.

Miao-tzu-hu tao (Middle Fisherman island) is 449 feet (136^m9) 50 high and lies westward of Ch'ing-peng tao; the passage between is encumbered with islets. Huang-hsing tao (West Fisherman island) is 693 feet (211^m2) high and separated from Miao-tzu-hu tao by a deep passage about one mile wide. Ts'ai-tzu shan (Wood islet) off

Chart 1124.

the southern entrance of this passage, is 129 feet (39^m3) high and lies about 1½ miles south-eastward of the southern end of Huang-hsing tao; it is rocky, precipitous, and barren. Ballard islet lies about a quarter of a mile south-eastward of the southern end of Huang-hsing tao. Kliene islet, 86 feet (26^m2) high, lies in the northern entrance and about 4 cables westward of the northern point of Miao-tzu-hu tao; a rock, which dries 12 feet (3^m7), lies about 2 cables northward of the islet.

- 10 Palmer islets are a group of three islets lying off the north-western end of Huang-hsing tao; two of them lie close together, and the inner and larger of these is 185 feet (56^m4) high and lies about 2 cables off the western point of Huang-hsing tao. The third islet is 98 feet (28^m9) high and lies about half a mile south-westward of the same point.

There is anchorage for one vessel, with local knowledge, about 1½ cables off the north-western coast of Hsi-fu shan, in a depth of 10 fathoms (18^m3), mud, with Ballard islet bearing 271°, and just open southward of Miao-tzu-hu tao, and the eastern extremity of Ch'ing-peng tao in line with Carles islet, bearing 357°.

Vessels with local knowledge can also obtain anchorage, sheltered from northerly and easterly winds, in the entrance to the bay on the south-western side of Miao-tzu-hu tao, in depths of from 6 to 7 fathoms (11^m0 to 12^m8), mud, with Kliene islet (*Lat.* 30° 13' N., *Long.* 122° 40' E.) in line with the western entrance point of the bay, bearing about 324°; rocks extend from the northern shore of the bay, and the outer of these, which dries 12 feet (3^m7), lies nearly in the middle of the bay and has a depth of 5 fathoms (9^m1) close outside it.

Hsiao-pan men.—Islands and dangers.—Hsiao-pan men (Steep Island pass) lies between Huang-hsing tao and Palmer islets, eastward, and San-feng tao (Tripod island) and Hsiao-pan tao (Steep island), westward. It is the most frequented of the various passages between the islands westward of Tung-fu shan, as it is free from danger and is deep throughout. See view on chart 1224.

35 San-feng tao, situated about 2½ miles westward of Huang-hsing tao, has three peaks, the southernmost and highest being 355 feet (108^m2) high; a vertical cliff, about 250 feet (76^m2) high, on the south-eastern side of the island, is noticeable on north-easterly or south-westerly bearings. An islet, 147 feet (44^m8) high, lies close off the western side of San-feng tao. Hsiao-pan tao lies close northward of San-feng tao; it is about 200 feet (61^m0) high and has a remarkable boulder on its southern slope. Andersen rock, lying about 3 cables north-westward of Hsiao-pan tao, is a pinnacle with a depth of 4 feet (1^m2) over it; the sea never breaks on this rock, but there are generally tide-rips in the strength of the tidal streams.

Light.—Fog signal.—A light is exhibited, at an elevation of 241 feet (73^m5), from a black circular tower, 47 feet (14^m3) in height, situated on the summit of Hsiao-pan tao; the keepers' dwelling is white. A fog signal is made from the north-eastern side of the island.

50 **Islands, dangers, and passages between San-feng tao and Ch'ang-t'u shan.**—Brenan pass lies between San-feng tao and Ya-chang tao (Brenan island), situated about one mile west-north-westward. Ya-chang tao is 148 feet (45^m1) high and has an islet close off its south-western side, and a rock, 15 feet (4^m6) high, off its northern end.

Charts 1199, 2412, 1262, 2347, 1263.

Chart 1124.

Hewett islands are a group of islets and rocks lying within one mile north-westward of Ya-chang tao; Ts'ai-hua tao, the eastern of the two largest islands, is 175 feet (53^m3) high; Chih-chih tao, the western, is 222 feet (67^m7) high. Hewett pass lies between Hewett islands and Tung-chai tao (Medusa island), which is 267 feet (81^m4) high and lies about 1½ miles westward. A rock, 5 feet (1^m5) high, lies about a quarter of a mile off the north-eastern point of Tung-chai tao, and another, 9 feet (2^m7) high, lies 4 cables westward of its north-western point, with an islet, 198 feet (60^m3) high, between. Hall pass lies between Tung-chai tao and Ta-hsi-chai tao (Hall island), which lies nearly one mile further westward. Brennan, Hewett, and Hall passes are available for power vessels, but they are seldom used except by junks, the route through Hsiao-pan men being usually taken.

Ta-hsi-chai tao, the largest island between San-feng tao and Ch'ang-t'u shan, situated about 9 miles west-north-westward, is 628 feet (189^m9) high and has two summits with a saddle between; an islet, 53 feet (16^m2) high, lies about 4 cables south-eastward of its south-eastern point, with another islet close westward of it. A chain of islets, from 47 to 154 feet (14^m3 to 46^m9) high, extends about three-quarters of a mile south-eastward from a point near the centre of the southern side of Ta-hsi-chai tao (*Lat.* 30° 14' N., *Long.* 122° 29' E.).

Chart 2974.

Hertz islands, consisting of Heng-tang shan, 170 feet (51^m8) high, and Hsiao-heng-tang, 162 feet (49^m4) high, south-westward of it, lie within one mile south-westward of the western end of Ta-hsi-chai tao; an 8-fathom (14^m6) patch lies about a quarter of a mile southward of Hsiao-heng-tang.

Chart 1124.

Pen-po shan (Bees island), 172 feet (52^m4) high, lies about one mile northward of Ta-hsi-chai tao, with an islet, 60 feet (18^m3) high, close southward, and a rock, with a depth of less than 6 feet (1^m8) over it, about 1½ cables further southward.

Chart 2974.

Hsiao-hsi-chiao shan or Hsiao-chai shan, (Will island) 345 feet (105^m2) high, lies about one mile westward of Pen-po shan, with a number of rocks, above water or drying, between. Ying-lien shan (Muran) is 277 feet (84^m4) high and lies about three-quarters of a mile westward of Hsiao-hsi-chiao shan, with several islets, including three over 100 feet (30^m5) high, and some rocks, between. Nan-mu-chiang (Tsinghi), 174 feet (53^m0) high, lies about half a mile southward of Ying-lien shan.

The eastern end of Ch'ang-t'u shan lies about one mile westward of Ying-lien shan and Nan-mu-chiang, but the passage between is narrowed to less than half a mile by a shoal bank extending off Ch'ang-t'u shan, on which several islets and rocks are situated.

The passage between the various islands which lie between Ta-hsi-chai tao and Ch'ang-t'u shan should not be attempted, as there are many dangers and the tidal streams are strong.

Charts 2974, 1124.

Anchorage.—The particulars of anchorages given hereafter, for vessels with local knowledge, may be useful:—One small vessel can obtain anchorage in a small bay on the north-western side of San-

Charts 1199, 2412, 1262, 2347, 1263.

Charts 2974, 1124.

feng tao, sheltered from southerly and south-easterly winds, in depths of from 6 to 14 fathoms (11^m0 to 25^m6), mud, with the northern point of Huang-hsing tao in line with the southern point of Hsiao-pan tao, bearing 080°, about 3 cables offshore.

Anchorage can be obtained off the south-western coast of Ta-hsi-chai tao, sheltered from northerly and easterly winds. There is a depth of 10 fathoms (18^m3) half a mile offshore, shoaling gradually to one fathom (1^m8) close in, the bottom being soft mud; in order to keep out of the strong stream, setting south-eastward through the gap between Ta-hsi-chai tao and Hertz islands, the summit of Hsiao-hsi-chiao shan (*Lat.* 30° 15' *N.*, *Long.* 122° 28' *E.*) should not be opened westward of Ta-hsi-chai tao.

There is an excellent boat harbour on the northern side of Ta-hsi-chai tao, with a depth of 3 fathoms (5^m5) in its entrance, shoaling to one fathom (1^m8) at the head, and sheltered from east to west-north-west, through south. There is good anchorage, in depths of from 10 to 14 fathoms, (18^m3 to 25^m6), mud, off this boat harbour.

Chart 2974.

30 Ch'ang-t'u shan.—Islets and dangers.—Anchorage.—Ch'ang-t'u shan consists of the two islands Ta-ch'ang-t'u shan (Chang-tau major) and Hsiao-ch'ang-t'u shan (Chang-tau minor), separated from each other by a narrow strait, known as Ch'ang-t'u chiang (Chang-tau harbour), described on page 341. Ta-ch'ang-t'u shan, the eastern island, is nearly divided into two parts by a bay, named Tung-chien chiang, the southern side of which is, however, almost entirely filled by a drying mud flat. The highest peak of the island, 940 feet (286^m5) high, is situated on the western side of this bay. Eden point is the southern point of a promontory, 575 feet (175^m3) high, which forms the south-eastern extremity of Ta-ch'ang-t'u shan; an islet, 241 feet (73^m5) high, lies nearly three-quarters of a mile west-north-westward of Eden point, and a rock, which dries 8 feet (2^m4), lies close off the southern side of this islet. A rock, with a depth of 4 fathoms (7^m3) over it, lies about one mile southward of Eden point.

35 Ing-longa, situated about 2½ miles westward of Eden point, is a pyramidal-shaped islet, 95 feet (29^m0) high; a rock, 5 feet (1^m5) high, lies close off its south-eastern point. Anchorage can be obtained north-eastward of Ing-longa, in depths of from 3 to 6 fathoms (5^m5 to 11^m0) mud, sheltered from west to east-north-east, through north. Yüan shan (Grass island), lying about three-quarters of a mile westward of Ing-longa, is 349 feet (106^m4) high and of much the same colour as Ta-ch'ang-t'u shan, and, as it lies close inshore, it does not stand out plainly; an islet, 112 feet (34^m1) high, lies close off the south-western point of Yüan shan. Brennan rock, lying about one mile southward of Yüan shan, is a pinnacle with a depth of 2 fathoms (3^m7) over it, and is steep-to; the sea never breaks on this rock, and there are no indications of its existence. An island, 142 feet (43^m3) high, and several rocks, lie on the shore bank between Yüan shan and the western end of Ta-ch'ang-t'u shan.

50 An islet, 137 feet (41^m8) high, lies about 2½ cables offshore about 2 miles westward of Yüan shan. Black rocks, thirteen in number, extend about half a mile southward from this islet; the highest of these rocks, 29 feet (8^m8) high, lies about one cable within the outer end of the group, and there are three rocks outside it which cover.

Charts 1199, 2412, 1262, 2347, 1263.

Chart 2974.

Fuller rock (*Lat. 30° 13' N., Long. 122° 16' E.*), with a depth of $1\frac{1}{2}$ fathoms ($2^{\text{m}}3$) over it, lies about half a mile westward of the highest Black rock. Chua-bek san, an islet 109 feet ($33^{\text{m}}2$) high, lies about half a mile westward of the 137-foot ($41^{\text{m}}8$) islet, and the space 5 between is almost entirely occupied by shoal ground; Chua-bek san has a curious gap in it, open on north-westerly and south-easterly bearings. A rock, which dries 7 feet ($2^{\text{m}}1$), lies nearly one cable westward of the south-western point of Chua-bek san, and a similar rock lies close southward of the same point. Shoals, with depths of 10 $2\frac{1}{2}$ and $4\frac{1}{2}$ fathoms ($5^{\text{m}}0$ and $7^{\text{m}}8$) over them, lie about $5\frac{1}{2}$ and $3\frac{1}{2}$ cables, respectively, west-south-westward of the south-western extremity of Chua-bek san. Ta-yüan shan (Yua san), 291 feet ($88^{\text{m}}7$) high, lies close northward of Chua-bek san and its eastern extremity is close off the south-western point of Ta-ch'ang-t'u shan; it has a well- 15 defined summit 291 feet ($88^{\text{m}}7$) high. A detached 6-fathom ($11^{\text{m}}0$) patch lies about $5\frac{1}{2}$ cables west-north-westward of the south-western extremity of Ta-yüan shan. Ta-yüan-shan (Yua-san) spit is a sand-bank extending fully half a mile from the northern side of Ta-yüan shan, leaving a boat channel between it and the western end of 20 Ta-ch'ang-t'u shan. Fung-shui rock, situated about 6 cables north-westward of the south-western point of Ta-yüan shan, is 6 feet ($1^{\text{m}}8$) high and steep to on its north-western side.

Green rock, with a depth of less than 6 feet ($1^{\text{m}}8$) over it, lies about 2 cables north-north-eastward of the north-eastern point of Ta- 25 ch'ang-t'u shan. The point lying about one mile southward of Green rock is called Hung chia. To-tzu shan (Wasp island), 233 feet ($71^{\text{m}}0$) high, lies about a quarter of a mile off the middle of the northern coast of Ta-ch'ang-t'u shan; the Hornets, a rocky reef which dries from 8 to 10 feet ($2^{\text{m}}4$ to $3^{\text{m}}0$), lies about three-quarters 30 of a mile westward of To-tzu shan.

Hsiao-ch'ang-t'u shan the western island of Ch'ang-t'u shan, is well populated, and there are several villages on its southern side; the summit of the island, 976 feet ($297^{\text{m}}5$) high, is in the north-western part of the island and is prominent. The bay situated at the eastern 35 end of the northern side of the island, in which there is an islet, 126 feet ($38^{\text{m}}4$) high, is called Hu-pei ao. Cockchafer islet (*Lat. 30° 16' N., Long. 122° 16' E.*), lies about a quarter of a mile north-eastward of the north-western point of Hsiao-ch'ang-t'u shan. The dangers off the western coast are described with Chu-hsü Chiang (Tai-shan 40 channel) on page 340.

Islets and dangers in the southern approach to Chu-hsü Chiang.—Chiao-pei shan (Kau-pei), situated about $3\frac{1}{2}$ miles south-eastward of Chua-bek san, is a double rock, 76 feet ($23^{\text{m}}2$) high, covered with grass on top, with sufficient space between the two parts at high water 45 to permit a small boat to pass through. A depth of $6\frac{1}{2}$ fathoms ($11^{\text{m}}4$) is situated about 3 miles east-south-eastward of Chiao-pei shan. Hsiao-chiao-pei (Shio-kau-pei), situated about 4 cables west-north-westward of Chiao-pei shan, is 28 feet ($8^{\text{m}}3$) high and has a gap in the middle, which is prominent on south-easterly and north-westerly 50 bearings; a pinnacle rock, with a depth of 3 fathoms ($5^{\text{m}}5$) over it, lies about $1\frac{1}{2}$ cables eastward of Hsiao-chiao-pei. The tidal streams around Chiao-pei shan are rapid and variable, and power vessels of low power and sailing vessels should give this rock a berth of half a mile.

Charts 1124, 1199, 2412, 1262, 2347, 1263.

Chart 2974.

Ryrie rock, situated about $1\frac{1}{2}$ miles westward of Hsiao-chiao-pei, is a pinnacle with a depth of $3\frac{1}{2}$ fathoms (6^m4) over it, and is steep-to ; there are no indications of the existence of this rock.

- 5 Wen-ch'ung shan (Mung-du san), situated nearly $2\frac{1}{2}$ miles north-westward of Hsiao-chiao-pei, is a rocky, precipitous islet, 111 feet (33^m8) high. Ta-chio, a broken, barren mass of rocks, 40 feet (12^m2) high, lies about $2\frac{1}{2}$ cables south-eastward of Wen-ch'ung shan, with foul ground between. Ryder rock, a pinnacle with a depth of 10 5 feet (1^m5) over it, lies about $3\frac{1}{2}$ cables eastward of Ta-chio, and a rock, with a depth of $1\frac{1}{2}$ fathoms (2^m7) over it, lies between. A rocky patch, which dries 10 feet (3^m0), lies close off the northern point of Wen-ch'ung shan.

- Chuma-kat-chi, situated about $6\frac{1}{2}$ cables west-north-westward of 15 Wen-ch'ung shan, is an islet 86 feet (26^m2) high, surrounded within a distance of about one cable by rocks and foul ground, except on its south-eastern side.

- Chu-hsü chiang.**—Islets and dangers.—Tidal streams.—Chu-hsü chiang (Tai-shan channel) situated between Ch'ang-t'u shan and 20 Tai shan (page 344), is deep in the fairway, mud bottom ; it requires careful navigation, but is useful for power vessels, and leads past the western entrance to Ch'ang-t'u chiang. The fairway of this channel and its southern approach have been examined by sweeping.

- The eastern coast of Tai shan, forming the western side of the 25 channel, is indented by bays, but they are completely filled by mud flats. P'u-men shan (Pu islet), 225 feet (68^m6) high ; Ta-pu-ma, 232 feet (70^m7) high ; and Ya-pu-ma, 101 feet (30^m8) high, are three rocky precipitous islets, covered with grass, lying on a mudbank separated from the south-eastern point of Tai shan by a narrow pas- 30 sage called P'u-men chiang. Three small islets, from 35 to 90 feet (10^m7 to 27^m4) high, lie close off the south-western side of P'u-men shan (*Lat.* $30^{\circ} 14' N.$, *Long.* $122^{\circ} 13' E.$), and another, about 50 feet (15^m2) high, lies off its north-eastern side, with a rock, drying 5 feet (1^m5), close eastward of it.

- 35 Baylis rock, with a depth of 4 feet (1^m2) over it, lies on the eastern side of the fairway and about 3 cables westward of the south-western point of Hsiao-ch'ang-t'u shan. Rocks, above and below water, including one 20-feet (6^m1) high, lie off this point. Mitchell rock, also situated on the eastern side of the fairway, has a depth of 4 feet 0 (1^m2) over it, and lies about 2 cables westward of the north-western point of Hsiao-ch'ang-t'u shan.

- Two $4\frac{1}{2}$ -fathom (7^m8) patches lie close together on the western side of the channel about one mile northward of P'u-men shan, and a rock, drying 6 feet (1^m8), lies on the edge of the same side of the channel 45 about $1\frac{1}{2}$ miles further northward.

- Ta-chu hsü (Gansu island), 212 feet (64^m6) high, and Hsiao-chu hsü (Maxwell island), 117 feet (35^m7) high, lie on a shoal middle ground in the northern entrance to Chu-hsü chiang ; rocks, including one 31 feet (9^m4) high, and another, which dries 7 feet (2^m1), extend 50 about 3 cables westward from Ta-chu hsü. Rocks, above water, extend $1\frac{1}{2}$ cables westward from Hsiao-chu hsü, and rocks, with depths of 2 fathoms (3^m7) over them, lie, respectively, $1\frac{1}{2}$ cables eastward and 2 cables northward of its eastern extremity. Singleton spit is a bank of black sand extending about one mile north-eastward

Charts 1124, 1199, 2412, 1262, 2347, 1263.

Chart 2974.

from Ta-chu hsü; there is a depth of $3\frac{1}{2}$ fathoms (6^m0) at the outer end of this spit.

The north-going tidal stream in Chu-hsü chiang runs from about 3 hours before to 3 hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and the south-going stream from about 3 hours after high water until 3 hours before the next high water; the maximum rate of both streams is from 4 to 5 knots.

Directions.—A vessel making for Chu-hsü chiang from southward, after passing Chiao-pei shan (*Lat. $30^{\circ} 11' N.$, Long. $122^{\circ} 18' E.$*), should steer to pass midway between Wen-ch'ung shan and the $2\frac{1}{2}$ -fathom (5^m0) patch situated $5\frac{1}{2}$ cables west-south-westward of Chua-bek san. When the western point of Ta-chu hsü is in line with the 20-foot (6^m1) high rock lying off the south-western point of Hsiao-ch'ang-t'u shan, bearing 353° , a north-westerly course should be steered so as to pass westward of Baylis rock; the summit of Ta-yüan shan should be kept open southward of Fung-shui rock until the eastern extremity of Hsiao-chu hsü is open of the western side of Hsiao-ch'ang-t'u shan. After passing Baylis rock a mid-channel course may be steered until the eastern extremity of Hsiao-chu hsü bears 040° , when steer for it on that bearing and pass not less than 2 cables south-eastward of this island; the western extremity of Wen-ch'ung shan bearing 184° , and just open westward of the western side of Hsiao-ch'ang-t'u shan, leads westward of Mitchell rock. The western extremity of Hsiao-ch'ang-t'u shan bearing 197° , and open eastward of Hsiao-chu hsü, leads close eastward of Singleton spit.

A vessel making for Chu-hsü chiang from northward should steer for the north-western point of Hsiao-ch'ang-t'u shan bearing 214° , until the northern sides of Ta-chu hsü and Hsiao-chu hsü are in line bearing about 292° ; then steer about 242° until the western side of Wen-ch'ung shan is open westward of the western side of Hsiao-ch'ang-t'u shan, when the directions given for vessels from southward can be followed in the reverse order.

Ch'ang-t'u chiang. — **Anchorage.** — **Tidal streams.** — Ch'ang-t'u chiang (Chang-tau harbour), the narrow strait between Ta-ch'ang-t'u shan and Hsiao-ch'ang-t'u shan, is completely landlocked, and affords anchorage for several vessels in depths of from 5 to 13 fathoms (9^m1 to 23^m8); it is an excellent refuge in a typhoon, and is the best in the approach to Ch'ang chiang or Yangtze kiang. The harbour is available for vessels drawing not more than 24 feet (7^m3); vessels drawing 16 feet (4^m9), provided they are moderately short, can enter by either entrance, but larger vessels must enter from Chu-hsü chiang, as the eastern entrance has a sharp turn, where it is difficult to handle vessels of any size in the strong tidal streams.

The best anchorage is off the middle of the southern side of Hsiao-ch'ang-t'u shan, where the strait is nearly 3 cables wide, with depths of from 4 to 7 fathoms (7^m3 to 12^m8). In a typhoon vessels moor with from 40 to 50 fathoms (73^m2 to 91^m4) on each cable up and down stream, as the tidal streams cause a single anchor to foul; the sides of the harbour are of mud and are steep-to, so that a vessel may not sustain much damage even if the cable parts. No swell is felt in the harbour, but on the approach of a typhoon, and during its continuance, the easterly swell curls on Chua-bek san and breaks on Ta-yüan-shan spit.

Charts 1124, 1199, 2412, 1262, 2347, 1263.

Chart 2974.

The tidal streams run in the direction of the harbour, the east-going stream from about 3 hours before until 3 hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and the west-going stream from 3 hours after high water until 3 hours before the next high water; the maximum rate is from 2 to 3 knots at spring tides, except in the western entrance, where they may attain a rate of 5 knots.

Directions.—Small vessels can enter or leave Ch'ang-t'u chiang by either entrance at any state of the tide, but vessels exceeding 200 feet (61^m0) in length should do so at slack water.

A vessel from southward, entering from Chu-hsü chiang, can proceed as directed for that channel, continuing with the western point of Ta-chu hsü in line with the 20-foot (6^m1) high rock lying off the south-western point of Hsiao-ch'ang-t'u shan, bearing 353° until Fung-shui rock (*Lat. 30° 14' N., Long. 122° 15' E.*) is abeam. Thence steer for the entrance of the harbour, passing from a half to one cable northward of Fung-shui rock. When past this rock bring it in line with the south-eastern extremity of Ya-pu-ma, bearing 226° astern, so as to clear Ta-yüan-shan spit. A rocky point on the northern side of the harbour, and about 7 cables north-eastward of Fung-shui rock, should be passed at a distance of three-quarters of a cable; thence hold this shore, which is mud and steep-to, until past a rock, which dries 10 feet (3^m0), lying on the southern side of the harbour and about half a mile eastward of the rocky point. A mid-channel course can then be steered, anchoring before reaching the fishing stakes off a joss-house on the southern side of the harbour. The navigable channel abreast Fung-shui rock is only about 1½ cables wide.

The eastern entrance is difficult to identify from seaward. The channel lies between the 126-foot (38^m4) high islet in Hu-pei ao (page 339), and the bluff north-western point of Ta-ch'ang-t'u shan, and is here about 3 cables wide, with a least depth of 3½ fathoms (5^m9) in the fairway. When entering, the bluff point on the eastern side should be held fairly closely, thence keeping a mid-channel course up the harbour. The narrowest part of the harbour is at the sharp bend by the south-eastern point of Hsiao-ch'ang-t'u shan, where it is only about 1½ cables wide, and great attention to the helm is necessary.

Approaching the eastern entrance from eastward, care must be taken that the northern extremity of To-tzu shan does not bear less than 090° until westward of the Hornets.

The eastern entrance has several disadvantages, as, besides the difficulty of identifying the entrance, and the sharp, narrow turn to be negotiated inside, numerous fishing boats and nets will be encountered before reaching the best anchorage. These are usually very much in the way, the nets stretching half-way across the harbour abreast the joss-house on the southern shore. In May, June, and July as many as 2,300 fishing boats have been counted in the harbour at one time.

Channels southward of Tai shan.—Islands and dangers.—Tidal streams.—There are several channels between the islands Ch'ang-pai shan and Hsiu shan (page 316) on the south, and the southern side of Tai shan on the north; they are separated by a number of islands, islets and rocks, between which these channels are narrow, intricate

Charts 1124, 1199, 2412, 1262, 1263.

Chart 2974.

and deep. Local knowledge is essential for navigation in this locality.

Hui-pei shan (Hui-pei), an islet, 90 feet (27^m4) high, situated about 2½ miles northward of the northern extremity of Ch'ang-pai shan, is surrounded by foul ground for a distance of about 2 cables, and there are very irregular depths around. Hsiao-hui-pei shan (Shio-hui-pei) (*Lat. 30° 15' N., Long. 122° 05' E.*) is an islet, 64 feet (19^m5) high, lying nearly 1½ miles eastward of Hui-pei shan, and a shoal, with depths of less than 3 fathoms (5^m5) over it, extends about 2 10 cables from its western side.

Cluster islets consist of two islets, lying on a bank, with depths of less than 3 fathoms (5^m5) over them, and several rocks; the larger of the two islets is 219 feet (66^m7) high and lies about 1½ miles north-eastward of Ch'ang-pai shan. A rocky patch, with a least depth of 4 15 fathoms (7^m3) over it, lies about 4 cables north-north-eastward of the smaller islet.

Ta-chiao shan (To-go san) lies with its south-western point about 3½ miles east-north-eastward of the eastern point of Ch'ang-pai shan, and consists of two hills, 344 and 236 feet (104^m8 and 71^m9) high, 20 respectively, connected by a low, narrow isthmus. A spit, with depths of 3 fathoms (5^m5) and less over it, extends about 1½ miles west-north-westward from Ta-chiao shan, and Read islets, 86 and 101 feet (26^m2 and 30^m8) high, lie on the outer end of this spit. An islet, 168 feet (51^m2) high, lies about 6 cables north-westward of the 25 south-western point of Ta-chiao shan.

Kuan shan (Kui san), situated about 1½ miles eastward of Ta-chiao shan, has a prominent dome-shaped summit 628 feet (191^m4) high.

Niu-ang shan (Moun) consists of two islands, 162 and 114 feet (49^m4 and 34^m7) high, respectively, lying about one mile south-eastward of 30 Kuan shan, and half a mile northward of Harty islets (page 317). Between Niu-ang shan and Minster point, situated at the north-western corner of Hsui shan, there is a chain of islets and rocks, including Herald islets and Hamlyn rocks, the details of which can best be seen from the chart. 35

Kuan-shan chiang (Kui-san pass), situated between the southern side of Kuan shan and the above-mentioned chain of islets and rocks, is navigable by full-powered vessels, and is the most direct route in the western approach to Chu-hsü chiang. The northernmost rock on the southern side of the channel dries 3 feet (0^m9), and about a quarter 40 of a mile eastward of it is a rock with a depth of 1½ fathoms (2^m7) over it. There are strong eddies and whirls in Kuan-shan chiang.

To-chi san, 137 feet (41^m8) high, lies about three-quarters of a mile northward of Ta-chiao shan, and is the western of a chain of islets and rocks off the southern coast of Tai shan; Hsiao-chiao shan 45 (Shio-kui san), 188 feet (57^m3) high, and Hsiao-kuan shan (Shio-go san), 110 feet (33^m5) high, are the next eastward to To-chi san, and Collinson island (*Lat. 30° 13' N., Long. 122° 12' E.*), 153 feet (46^m6) high, lies eastward of Kuan shan; for details of the remainder the chart should be consulted. 50

Kao-t'ing chiang (Kau-ding pass), leading to Kao-t'ing-chen (Kau ding), a town near the south-eastern corner of Tai shan, is entered from westward between Ta-chiao shan and To-chi san; a rock, 28 feet (8^m5) high, lies about 1½ cables southward of To-chi san. The

Charts 1124, 1199, 2412, 1262, 1263.

Chart 2974.

channel runs between the chain of islets and rocks off the southern coast of Tai shan and Kuan shan. A detached 6-fathom (11^m0) patch lies on the eastern side of the southern entrance to Kao-t'ing chiang about 4½ cables west-north-westward of the south-western extremity of Kuan shan, and a 7-fathom (12^m8) patch lies about 3 cables south-south-westward of Hsiao-kuan shan. Bujega rock, with a depth of 3½ fathoms (6^m4) over it and steep-to, lies nearly half a mile eastward of Hsiao-kuan shan. The fairway of the passage between Kuan shan and Collinson island is deep, except for Gummer rock, a pinnacle with a depth of 2 feet (0^m6) over it, and a 4-fathom (7^m3) rocky patch about one cable southward of it, which lie in the middle of the northern entrance. Kao-t'ing chiang is navigable by full-powered vessels, and the coast of Kuan shan should be held fairly closely throughout, but Kuan-shan chiang is preferable in every way.

In Kuan-shan chiang and Kao-t'ing chiang the tidal streams run westward from about 3 hours before until 3 hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and eastward from about 3 hours after high water until 3 hours before the next high water; the maximum rate is from 5 to 8 knots, according to the age of the moon.

Tai shan.—Off-lying islands and dangers.—Anchorage.—Tidal streams.—Tai shan, the largest island in the northern group of Chou-shan ch'ün-tao, is divided into two main portions, both lying on a flat which dries. Both parts are hilly, and the highest peak, 822 feet (250^m5), lies in the south-eastern part of the eastern portion, but it is not particularly noticeable. Part of the eastern side of the island has been described with Chu-hsü chiang on page 340.

A reef, with a rock drying 3 feet (0^m9) at its outer end, extends about 2 cables off a point on the eastern coast situated about one mile northward of Ta-chu hsü. Between this point and the north-eastern point of Tai shan, lying about 1½ miles north-westward, a bank, with depths of 2½ fathoms (4^m6) over it, lies more than half a mile offshore. Devils rock (*Lat.* 30° 20' N., *Long.* 122° 14' E.), situated about 2 cables eastward of the north-eastern point of Tai shan, is black, conical, and 63 feet (19^m2) high. Castle rock, 204 feet (62^m2) high, the outermost of a chain of islets, from 107 to 235 feet (32^m6 to 71^m6) high, called T'ieh-tun-t'ou shan, which extend about 1½ miles north-north-westward from the northern point of Tai shan, is precipitous on its northern side and is prominent. There is a deep area close northward of Castle rock; at spring tides the tidal streams in this locality attain a rate of from 4 to 6 knots, causing whirls and eddies, and it is advisable to give the rock a berth of fully half a mile. Primmer rock, situated nearly 1½ miles eastward of Castle rock, has a depth of 5 feet (1^m5) over it and is generally marked by tide-rips. Hsia-p'a chiao (Dumb-bell islet) (page 345) bearing 271°, and open northward of Castle rock, leads about a quarter of a mile northward of Primmer rock; the 940-foot (286^m5) high peak of Ta-ch'ang-t'u shan bearing 131°, and open north-eastward of Devils rock, leads close north-eastward of Primmer rock.

Hughes islands, two in number, lie about 1½ miles apart at either end of a bank, with depths of less than 3 fathoms (5^m5) over it, which lies parallel to the north-western side of Tai shan and about three-quarters of a mile from it; Tung-k'en shan, the eastern island, is 258

Charts 1124, 1199, 2412, 1262, 1263.

Chart 2974.

feet (78^m6) high and lies about 2½ miles west-south-westward of Castle rock; Hsi-k'en shan, the western island, is 215 feet (65^m5) high. The bank extends nearly half a mile westward from the northern extremity of Hsi-k'en shan, and there are some rocks above 5 water and a sunken rock on this portion. A rock, 33 feet (10^m1) high, lies about 2 cables northward of the eastern point of Tung-k'en shan, and a sunken rock lies about 1½ cables westward of this rock. Anchorage, sheltered from winds from between east and south-west, through south, can be obtained between Tung-k'en shan and Castle 10 rock, in depths of from 4 to 10 fathoms (7^m3 to 18^m3), but the tidal streams attain a rate of from 3 to 5 knots. There is a navigable passage between Hughes islands and Tai shan. The point on the coast of Tai shan opposite Hughes islands is called Liao-tsei tsui.

Liang-t'ou-tung (Ya-do-dong), an island separated from the western 15 side of Tai shan by Liang-t'ou-tung men or Yadotung pass (Ya-do-dong pass), is 541 feet (156^m7) high and divided into three parts at high water. Liang-t'ou-tung men, which has been examined by sweeping, has a least depth of 7 fathoms (12^m8) in the fairway; the western side should be held, as a mud bank, on which there are 20 two islets, 170 and 176 feet (51^m8 and 53^m6) high, respectively, extends from the western side of Tai shan, which forms the eastern side of the pass. A vessel intending to pass through this channel from northward should approach with Hsiao-huei-pei shan in line with the western extremity of Tai shan, bearing 175°, which leads 25 clear of the shoal water which extends from Hsi-k'en shan; when the northern hill of Liang-t'ou-tung, 310 feet (94^m5) high, is abeam, course should be altered to 188°, which leads through.

In Liang-t'ou-tung men the south-west-going stream runs from 2½ hours before until 2½ hours after high water at Yangtze approaches 30 (Admiralty Tide Tables Standard Port), and the north-east going stream from 2½ hours after high water until 2½ hours before the next high water; the maximum rate of the tidal stream is from 3 to 4 knots at spring tides.

The two Becher islets, 136 and 152 feet (41^m4 and 46^m3) high, 35 respectively, lie south-westward of Liang-t'ou-tung, and are separated from that island by a navigable passage, fully one mile wide, with a least depth of 4½ fathoms (8^m2) in the fairway.

On the north-eastern side of the fairway, and about 2 cables off Liang-t'ou-tung, is a rock which dries 6 feet (1^m8). Kestrel rock, 40 situated about half a mile south-eastward of the eastern Becher islet, dries 3 feet (0^m9). Drew rock, lying about three-quarters of a mile south-eastward of Kestrel rock (*Lat.* 30° 17' N., *Long.* 122° 02' E.), is a pinnacle with a depth of 2 feet (0^m6) over it; except with very smooth water, and during the strength of the tidal streams, there 45 is no indication of its existence. An islet, 91 feet (27^m7) high, lies nearly 1½ miles northward of the western Becher islet, and a rock, 24 feet (7^m3) high, lies about 3 cables south-eastward of it.

Hsia-p'a chiao (Dumb-bell islet), 45 feet (13^m7) high, lies about 3 miles northward of the northern extremity of Liang-t'ou-tung; a 50 rock, with a depth of 5 feet (1^m5) over it, lies about half a cable southward of this islet.

Chart 1124.

Chai-tzu shan (Skead islets) consists of two islets, 141 feet (43^m0)

Charts 1199, 2412, 1262, 1263.

Chart 1124.

high, close together, which lie about 2 miles north-eastward of Hsia-p'a chiao; the depths around are irregular. Pai-mou-tien chiao (Mariner rocks), situated about $2\frac{1}{2}$ miles northward of the Chai-tzu shan, consists of two pinnacles about $1\frac{1}{2}$ cables apart; the south-eastern rock has a depth of 5 feet (1^m5) over it, and the north-western 3 feet (0^m9). A $3\frac{1}{2}$ -fathom (6^m4) patch lies about $5\frac{1}{2}$ miles west-north-westward of Chai-tzu shan, and a similar patch lies about $4\frac{1}{2}$ miles north-westward of these islets.

- 10 **Huo-shan lieh-tao.**—Huo-shan lieh-tao (Volcano islands) is a group at the north-western end of Chou-shan ch'ün tao. Ta-yü shan (Uan san), the largest and easternmost island of the group, lies with its southern point about 5 miles westward of Liang-t'ou-tung; it rises to a ridge with several well defined peaks, the highest, situated at
15 the northern end of the island, being 492 feet (150^m0) high. A mud bank, with depths of less than 3 fathoms (5^m5) over it, extends eastward nearly to Becher islets; a mud bank also extends for about $3\frac{1}{2}$ miles westward from Ta-yü shan, and dries over a great part. A rock, 8 feet (2^m4) high, lies about 2 cables eastward of the northern
20 end of Ta-yü shan, and an islet, 147 feet (44^m8) high, lies off its southern end. Hsiao-yü shan (Shio-chi san), with a hill in its centre 411 feet (125^m3) high, and several other islands and rocks lie on the western mud bank; Hsiao-ch'en shan, 149 feet (45^m4) high, is the western island, and Ta-ch'en shan, 192 feet (58^m5) high, lies close
25 south-eastward of it; for the details of the remainder, the chart should be consulted. A rock, 21 feet (6^m4) high, lies outside this bank and about one mile southward of Hsiao-yü shan. An islet, 116 feet (35^m4) high, lies about 2 miles northward of Hsiao-yü shan, and about half a mile further northward is a rock 8 feet (2^m4) high,
30 named Huang chiao.

Yü-hsing-nao (West Volcano island), situated about $3\frac{1}{2}$ miles north-westward of Hsiao-yü shan, is a black rock 63 feet (19^m2) high, split in two, the northern part being small. Two rocks close together, which dry 4 feet (1^m2), lie about one cable southward of the islet.
35 Howlin rock, lying about 6 cables south-westward of Yü-hsing-nao, is a pinnacle with a depth of $1\frac{1}{2}$ fathoms (2^m7) over it. A reef, with three rocks on it, the highest of which is 38 feet (11^m6) high, lies about three-quarters of a mile south-south-eastward of Yü-hsing-nao. Lake rock, situated about 3 cables north-eastward of Yü-hsing-nao,
40 consists of two pinnacles a quarter of a cable apart; the south-eastern pinnacle has a depth of 3 feet (0^m9) over it, and the north-western a depth of 2 fathoms (3^m7) over it. The tidal streams may attain a rate of 7 knots in this vicinity.

A $3\frac{1}{2}$ -fathom (6^m4) patch lies about $1\frac{1}{2}$ miles north-north-eastward of
45 Yü-hsing-nao, and less depths than shown on the charts were reported, in 1910, for about 3 miles northward and north-eastward of this patch.

Light.—Fog signal.—A light is exhibited, at an elevation of 93 feet (28^m3), from a black circular tower, 33 feet (10^m1) in height, on the summit of Yü-hsing-nao (*Lat. $30^\circ 21' N.$, Long. $121^\circ 50' E.$*). The
50 keepers' dwelling is white. A fog signal is sounded from the lighthouse.

Chart 1592.

YUNG CHIANG.—General remarks.—Yung chiang (river), which rises in the high ranges of the province of Chekiang, flows into the

Charts 1429, 1199, 2412, 1262, 1263.

Chart 1592.

sea about 2 miles westward of Ch'ang-t'iao tsui (page 326). At the city of Yin-hsien (Ning-po-fu), situated about 12 miles above the mouth, the river divides into two branches; the north-western branch, Yü-yao chiang (Yü-yao and Tsie-kie branch) leads to the town of Yü-yao, situated about 15 miles north-westward of Yin-hsien; the southern branch, Yin chiang (Funghwa branch), is barely one cable wide. Chen-hai (Chinhai), the port of Yin-hsien, is situated on the western side of the mouth of the river. 5

The least depth in the fairway of the river up to Yin-hsien, in 1928, was 9 feet (2^m7). Strong winds from between north and north-east usually raise the water level in the river about 1½ feet (0^m5) above normal; strong winds between north and north-west considerably retard the outflow of the ebb tide and cause irregularity in the normal times of low water. In the winter, from December to March, the water level is usually about 1½ feet (0^m5) lower than in the summer months of August and September. In 1935, vessels with a draught of 19½ feet (5^m9) could proceed to Yin-hsien; vessels not exceeding 10 feet (3^m0) in draught could enter the river at any state of the tide. There is no berth at Yin-hsien for vessels exceeding 355 feet (108^m2) in length. 20

Pilots.—There are licensed pilots for Yung chiang; previous arrangements should be made by communicating with the Harbour-master at Yin-hsien. The pilot usually meets a vessel in the vicinity of Nemesis rock or Ch'i-li (*see* below); the pilot's sampan flies the usual white and red horizontal pilot flag. Vessels should not enter Yung chiang without a pilot. 25

Islands and dangers in the approach.—**Buoy and beacons.**—Ch'i-li (Tse-le), situated about 1½ miles northward of Ch'ang-t'iao tsui, is a bold, rocky island of a dark colour, 90 feet (27^m4) high; it is precipitous on its northern side. The depths around the island are very irregular, the island being surrounded by deep water except on the north-western side, although it lies well within the 5-fathom (9^m1) line of the shoal water extending south-eastward from Hang-chow wan (Hangchow bay). Considerable shoaling was reported, in 1948, about 7 cables northward of the island. 35

Wai-yu shan (Tayu san), 124 feet (37^m8) high, lies with its eastern extremity about three-quarters of a mile west-north-westward of Ch'ang-t'iao tsui (*Lat.* 29° 58' N., *Long.* 121° 46' E.); a mud bank, which dries, extends about 3 cables westward from this island, and Hsiao-yu shan (Siau yü), 100 feet (30^m5) high, lies on its south-western part. These islands lie at the eastern end of a shoal spit extending eastward from the shore bank westward of the river entrance, and forming the northern side of the approach to the entrance channel. Both these islands are cliffy, with rocky coasts, and are of a light colour, being covered with grass. Wai-yu shan is divided into two nearly equal parts; the eastern point of the southern part is a long rocky ledge, partly awash at high water. Nemesis rock, situated about one cable north-eastward of this point, dries 2 feet (0^m6), and is marked by a red spar beacon surmounted by a day mark. An outer bar, with depths of about 2 to 3 fathoms (3^m7 to 5^m5) over it, lies between Nemesis rock and the shore south-eastward of it. 50

Sesostris rock, situated about 2 cables south-south-westward of the

Charts 1429, 1199, 2412, 1262, 1263.

Chart 1592.

south-western point of Hsiao-yu shan, is a pinnacle with a depth of $1\frac{1}{2}$ fathoms (2^m3) over it; a black and red chequered buoy, surmounted by a black daymark, is moored close northward of the rock.

5 Sesostris rock marks the outer limit of the bar of the river; the passage southward of the rock is shoal and is not used.

Hu-tun shan (Fu san), situated about half a mile south-westward of the south-western point of Hsiao-yu shan, is 110 feet (33^m5) high; it is a precipitous, rocky islet, dark and rugged. There is a landing
10 place, in fine weather, on the southern side of the island, where some steep steps lead up to the lighthouse; with south-westerly winds landing can be effected in a crack between the rocks on the northern side. Tiger's Tail consists of three rocks which dry; the outermost, which dries 5 feet (1^m5), is marked by a black iron beacon surmounted
15 by a white daymark, and lies about $1\frac{1}{2}$ cables north-westward of Hu-tun shan (*Lat.* $29^\circ 58' N.$, *Long.* $121^\circ 44' E.$).

Lights.—Fog signals.—A light is exhibited, at an elevation of 123 feet (37^m5), from a white octagonal tower, 33 feet (10^m1) in height, situated on the north-eastern end of Ch'i-li. A fog signal is occasion-
20 ally sounded from the lighthouse.

A light is exhibited, at an elevation of 148 feet (45^m1), from an octagonal tower, 30 feet (9^m1) in height, painted red and white in vertical stripes, on the summit of Hu-tun shan; the keepers' dwellings are also painted red and white in vertical stripes. A fog signal is
25 sounded from the lighthouse.

Anchorage.—There is good anchorage, for vessels awaiting the tide or unable to cross the bar, southward of Wai-yu shan, in a depth of about 8 fathoms (14^m6), with Ch'i-li lighthouse in line with the eastern point of Wai-yu shan, bearing 019° , and Hu-tun-shan lighthouse
30 bearing 258° . From this position communication with Chen-hai is easy.

Tidal streams.—The tidal streams set north-westward past Ch'i-li and Ch'ang-t'iao tsui from $2\frac{1}{2}$ hours before until $3\frac{1}{2}$ hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port),
35 and south-eastward from $3\frac{1}{2}$ hours after high water until $2\frac{1}{2}$ hours before the next high water; these times, however, are only approximate, as the duration of the streams is variable. The rate is from 2 to 6 knots, according to the age of the moon.

The in-going stream of the river commences $2\frac{1}{2}$ hours before high
40 water, and the out-going stream 3 hours after high water at Yangtze approaches; the rate is from one to 3 knots, according to the age of the moon. After heavy rain inland the out-going stream often runs for about 12 hours, and vessels do not swing to the in-going stream at all, but this does not appreciably affect the time of high water.

45 **Entrance to Yung chiang.—Bar.—Depths.**—The land on the eastern side of the entrance consists of extensive flat areas interspersed with hilly ridges; one of these ridges extends for nearly $2\frac{1}{2}$ miles south-south-westward from Ch'ang-t'iao tsui, and a lower ridge extends for about one mile in the same direction from Chin-chi shan (Kin-ki
50 hill), situated about 2 miles south-westward of Ch'ang-t'iao tsui. Between these ridges is Hsiao-chiang-kou (Siau-kong creek), which is navigable for small craft, and enters the sea under Wang-yuan (Wang-yuen) fort, situated nearly one mile westward of Ch'ang-t'iao tsui. Close south-westward of this fort is Li shan (Lookout hill),

Charts 1429, 1199, 2412, 1262, 1263.

Chart 1592.

a hill 236 feet (71^m9) high with a lookout tower on its summit. Kong-kau is a village on the western bank of Hsiao-chiang-kou, not far inside its entrance. Chin-chi shan has a mound on its summit, which is 329 feet (100^m3) high; a reef extends into the river from the foot of this hill, and on it is Siu-yuan (Sei-yuen) fort (*Lat.* 29° 58' N., *Long.* 121° 44' E.). Jing-yuan (Jing-yuen) fort lies on the coast about 3½ cables eastward of Siu-yuan fort. 5

The western entrance point of the river is a promontory rising to an elevation of 291 feet (88^m7); this hill, named Chao-pao shan (Citadel hill), has two large temples on its summit. The north-eastern extremity of the promontory is called Chung point. The country for many miles westward of Chen-hai is flat. 10

The bar of the river is mud, and extends from the vicinity of Sesostriis rock to about half a mile above Siu-yuan fort. The depths are liable to change; in 1935 its was reported that at times there were depths of only from 10 to 12 feet (3^m0 to 3^m7); the channel only scours again after heavy freshets. There are always numerous junks and other small craft, both moored and under way in the entrance to Yung chiang. The channel is obstructed by lines of dolphins across the river in the vicinity of Siu-yuan fort, and by fishing stakes on the eastern side of the bar above Siu-yuan fort. 20

The river.—Anchorages.—Jetty.—Berths.—The city of Chen-hai is surrounded by a massive wall, and has large suburbs on both sides of the river. A sloping wall of masonry protects the city and the flat country westward from the inroads of the sea. There is a stone jetty at Chiang-nan-shih (Kiang-nan), a village on the southern bank opposite Chen-hai. Tung shan (Castle hill), 218 feet (66^m4) high, lies about three-quarters of a mile south-westward of the jetty. Between Chen-hai and Yin-hsien, the river flows through low flat country which is highly cultivated; there are many small villages along the banks. 25

Anchorage can be obtained off the south-eastern corner of Chen-hai, in a depth of about 5 fathoms (9^m1), but it is necessary to moor; the navigable portion of the river above this is about one cable wide, and is usually crowded with junks. 35

The quarantine anchorage is situated on the northern side of the river about three-quarters of a mile above the jetty at Chiang-nan-shih (*Lat.* 29° 57' N., *Long.* 121° 53' E.). This anchorage is also used by vessels laden with dangerous cargo. 45

There are pontoons and wharves at Chen-hai; the two largest pontoons have a depth of 16 feet (4^m9) alongside. Vessels load and discharge cargo alongside pontoons. 50

Lights.—A light is exhibited, at an elevation of 26 feet (7^m9), from a black beacon with a black spherical daymark on the head of the jetty at Chiang-nan-shih. 55

A light is exhibited, at an elevation of 35 feet (10^m7), from a wooden pole surmounted by a black sphere situated on the northern side of the river and nearly 1½ miles westward of Chiang-nan-shih. A light is exhibited from a similar structure near Mei-su (Me-shu), a village situated about midway between Chen-hai and Yin-hsien. 60

Charts 1592, 1429.

Directions.—The depths in Yung chiang and its approaches are liable to constant change and the charts must be used with caution; local knowledge is essential for entering the river. The following 65

Charts 1199, 2412, 1262, 1263.

Charts 1592, 1429.

directions are merely intended as a guide to the general route to be taken until the pilot is met with near Nemesis rock.

A vessel approaching Yung chiang from northward should pass
 5 about 4 cables westward of Kan-ch'ih (page 327) and the same distance westward of the south-western point of T'ai-p'ing shan ; thence continue on a southerly course until the temples on Chao-pao shan are in line with the south-eastern side of Wai-yu shan, bearing about 240°, when steer a south-westerly course until Hu-tun-shan
 10 lighthouse opens southward of Wai-yu shan, bearing about 254°, following this mark until the pilot is taken on board.

A vessel approaching Yung chiang by Chin-t'ang yang (page 325) should pass about half a mile northward of Yu-en-su (page 322), half a mile southward of Huang-niu chiao, half a mile southward of
 15 Shuang chiao, 4 cables northward of O chiao, and then steer for Hu-tun-shan lighthouse, bearing about 254°, as above.

Chart 1592.

Yin-hsien. — Harbour limits. — Wharves. — Anchorages. — Tidal streams.—The Chinese city of Yin-hsien (Ning-po-fu), with a population of about 300,000, in 1952, is situated immediately above the
 20 junction of Yü-yao chiang and Yin chiang, its walls extending along the banks of both branches. The foreign settlement is on the western bank of the main river, and Yü-yao chiang flows round its northern and south-western sides. The former British Consulate
 25 (Lat. 29° 53' N., Long. 121° 33' E.), a red building, is situated in the foreign settlement and on the western bank of the main river ; the Custom house is about 1½ cables south-westward of the Consulate.

A short section of Yü-yao chiang is within the harbour limits ; the lower limit is about one mile down river from the junction.
 30 There are seven wharves at Yin-hsien, with a total frontage of about 1,000 feet (304^m8), and depths of from 12 to 24 feet (3^m7 to 7^m3) alongside. Three of the wharves are outside the harbour limits. A bridge of boats across Yü-yao chiang connects the foreign settlement with the city, and there is a similar bridge, which was being replaced
 35 by an iron bridge in 1936, across Yin chiang ; any of the pontoons in the centre of these bridges can be removed, by giving notice, to allow the passage of small craft.

Vessels moor in mid-stream off the foreign settlement, in depths of from 3½ to 5 fathoms (6^m4 to 9^m1). There are four swinging berths
 40 for vessels up to 320 feet (97^m5) in length. No. 1 berth is immediately above the Custom house, No. 2 is between the Custom house and the former British Consulate, No. 3 is below the Consulate, and No. 4 is opposite the foreign cemetery. It is advisable to have a taut moor, with four shackles on the upstream cable and three shackles on the
 45 downstream cable ; vessels coming in with the flood stream anchor above their berth, swing to their anchors, keeping them at short stay, then weigh and moor. There is only about 600 feet (182^m9) of swinging room ; vessels over 300 feet (91^m4) long must keep up steam and use their engines when swinging to the tides.

50 The quarantine anchorage and the anchorage for vessels laden with dangerous cargo are situated, respectively, about 3½ and 2 miles below the lower harbour limit.

The maximum rate of the flood stream is about 2 knots, and that of the ebb stream from 2 to 3 knots. At neap tides in late September,

Charts 1199, 2412, 1262, 1263.

Chart 1592.

1935, it was observed that there was no morning flood stream on three consecutive days, one to two hour periods of slack water being experienced instead. High water at Yin-hsien occurs one hour after high water at Ch'i-li. 5

The most convenient landing place is at the Custom house (*Lat.* 29° 53' N., *Long.* 121° 33' E.), but there is not sufficient depth for a boat from two hours before to two hours after low water; the Custom officials will place a sampan at their steps on request, and sufficient depth will be found alongside the sampan. 10

Storm signals.—Storm signals were formerly displayed at the Custom house flagstaffs at Yin-hsien and Chen-hai, and may still be in use; *see* Supplementary storm signals on page 27.

The direction from which gales are expected was signalled as follows:— 15

N.W. quadrant: By day, one cone point upward; at night, two *red* lights disposed vertically.

S.W. quadrant: By day, one cone point downward; at night, two *white* lights disposed vertically.

N.E. quadrant: By day, two cones points upward, disposed vertically; at night a *red* light above a *white* light. 20

S.E. quadrant: By day, two cones, points downward, disposed vertically; at night, a *white* light above a *red* light.

At Yin-hsien the direction symbols were hoisted on the north-western yardarm for gales from the N.W. and N.E. quadrants, and on the south-eastern yardarm for those from the S.W. and S.E. quadrants.

At Chen-hai the direction symbols were hoisted on the northern yardarm for gales from the N.W. and N.E. quadrants, and on the southern yardarm for those from the S.W. and S.E. quadrants.

Port signals.—The following special signals, by flags of the International Code of Signals, were in use at the port of Yin-hsien in 1948, in addition to those given on page 32:— 30

Signal

Flag L Mails for the Chinese Post Office

Flag L Customs Officer wanted 35

Flag N Berthing Officer wanted

Flag Y Ash boat wanted

Harbour facilities.—**Supplies.**—**Communications.**—Small repairs can be undertaken. There is a small dry dock; *see* Appendix 1, page 706. 40

There are seven small general hospitals in Yin-hsien.

A stock of about 8,000 tons of coal is maintained, and is delivered in barges. Limited stocks of fuel oil and Diesel oil are available.

Provisions and stores are available in limited amounts. Water is available; two days notice is required for large quantities. 45

There is railway communication with Hang-chou and Shang-hai. There is frequent steamer communication with Shang-hai and with the principal ports of Chou-shan ch'ün tao. Launches ply between Yin-hsien and Chen-hai, and between Yin-hsien and Yü-yao. Yin-hsien is connected to the general telegraph system. 50

Harbour regulations.—The following are extracts from the Harbour regulations for the port of Yin-hsien (1948):—

1.—The term "vessel" in these regulations refers to vessels of foreign type.

Charts 1429, 1199, 2412, 1262, 1263.

Chart 1592.

2.—The anchorage at Chen-hai for foreign type vessels is from An-yuen fort (western side of entrance) to the upper end of salt ponds on the southern bank of the river.

5 3.—Vessels requiring to anchor at Chen-hai shall, on arrival off Hsiao-yu shan, hoist the International Code flag N at the fore. They will be boarded by a Customs Boarding officer, who will direct them to proper berths.

4.—Vessels shall moor at Chen-hai in accordance with instructions
10 from the Customs Boarding officer.

7.—Vessels shall moor at Yin-hsien in accordance with instructions from the Harbour-master, and shall not shift their berths without a special permit, except when outward bound after having obtained their clearance papers.

15 8.—Vessels having on board as cargo any high explosives or the specially prepared constituents of such, any loaded shells or more than 100 pounds of gunpowder, any quantity of small-arm cartridges in excess of 50,000 rounds, or any other fixed ammunition of which the aggregate quantity of powder charges exceeds 100 pounds, shall
20 anchor in the anchorage for vessels laden with dangerous cargo, and fly a red flag at the fore; and in regard to the discharge of the same, they shall abide by the instructions received from the Customs.

Vessels having to receive on board any such explosives shall
25 observe similar precautions.

11.—Every craft of whatever description conveying explosives through any part of the waters of the port shall exhibit a red flag, not less than 6 feet by 4 feet (1^m8 by 1^m2), at the foremast head or where it can best be seen; and in the case of all boats or lighters
30 thus employed which are not fitted with masts, the red flag must be exhibited at a height of not less than 12 feet (3^m7) above the highest part of the deck or house.

14.—Vessels arriving with mineral oil, or cargo of a highly inflammable nature, shall anchor in the anchorage for vessels laden with
35 dangerous cargo, and must remain there until all such cargo has been discharged. Vessels loading such cargo shall do so only where it is permitted to be discharged, and from there proceed to sea. Vessels in the ordinary anchorage are permitted to handle such quantity of kerosene as may be approved by the Customs authorities.

40 Bulk-oil steamers are required to take all such precautions as are customary in their trade.

16.—Vessels having any infectious disease on board, or any disease suspected to be infectious, or the body of a person who died, or is suspected of having died of an infectious disease, shall, as provided
45 for in the quarantine regulations, on approaching the port, hoist the quarantine flag, anchor in the quarantine anchorage, and keep the flag flying until pratique has been granted.

No person shall be permitted to leave or board such a vessel without a permit from the Harbour-master or Port Health officer.

50 Vessels arriving from any port declared to be infected shall conform to the quarantine regulations.

18.—Ballast, ashes, garbage, refuse, spoil obtained by dredging or otherwise, etc., must not be thrown into the river. Vessels wishing to discharge ashes or other refuse should hoist the International Code

Chart 1592.

flag Y at the fore truck, when a licensed ash-boat will attend and take delivery.

20.—Vessels are required to conform to the "Regulations for Preventing Collisions at Sea".

21.—Vessels are forbidden to go at such a speed through the harbour as renders their wash dangerous to properly laden cargo-boats and sampans.

22.—The blowing of steam whistles or sirens, except for the purpose of signalling in accordance with the "Regulations for Preventing Collisions at Sea," or for the purpose of warning vessels of danger, is strictly forbidden.

23.—All vessels shall keep on board a sufficient number of hands to clear and pay out chain. The hawse must always be kept clear.

24.—No vessels, except men-of-war, may use swinging booms. Swinging booms should be rigged in from sunset to sunrise.

25.—No merchant vessel shall fire cannon or small-arms within the harbour.

27.—In case of fire occurring on board a vessel in port, the fire bell must be rung immediately by that vessel, and by those above and below her, and the signal NH, International Code ("Fire, want immediate assistance"), hoisted by the burning vessel, if possible, and by those above and below her, during the day, or a light lowered and hoisted continually, during the night. Notice should immediately be given to the Harbour-master.

Chart 1199.

HANG-CHOU WAN.—**General remarks.**—**Depths.**—Hang-chou wan (Hangchow bay) lies westward of the line between the mouth of Yung Chiang and Nan-hui tsui (Yangtze cape), situated about 55 miles northward. The bay is comparatively shoal, especially in the southern part, where there are generally depths of from $2\frac{1}{2}$ to 4 fathoms (5^m0 to 7^m3); in the northern part these increase to from 4 to 6 fathoms (7^m3 to 11^m0). At the head of the bay is the estuary of Ch'ien-t'ang Chiang (Kiang), and the important city of Hang-chou (Hangchow) is situated about 20 miles up this river; on the northern shore of the bay are the small cities of Hai-yen and Chin-shan-wei (Chinshan).

Southern shore.—**Island.**—The coast between Chen-hai and Fu-lung shan, situated about $11\frac{1}{2}$ miles north-westward, is partly hilly and partly flat, cultivated land; the latter is protected from the sea by an embankment. A mud bank dries out for about $1\frac{1}{2}$ miles outside this embankment. Hsieh-p'u shan (Niloshan), 222 feet (67^m7) high, with several rocks off its northern side, lies on the mud bank about 7 miles north-westward of Chen-hai. Fu-lung shan is a bluff headland 917 feet (279^m5) high. Westward of Fu-lung shan the land is low, cultivated, and fronted by a broad mud bank.

Light.—A light is exhibited, at an elevation of 226 feet (38^m4), from a white tower on the summit of Hsieh-p'u shan (*Lat.* $30^{\circ} 03' N.$, *Long.* $121^{\circ} 37' E.$).

Northern shore.—**Beacon.**—**Islets.**—**Anchorage.**—**Tidal streams.**—The northern shore of Hang-chou wan between Nan-hui tsui and Cha-p'u, situated about 42 miles south-westward, is low and is fronted by a mud bank which dries out to as much as 2 miles in places.

Charts 2412, 1262, 1263.

Chart 1199.

Nan-hui tsui and the coast for about 6 miles westward is described on page 377.

There is a beacon on the coast about 12 miles westward of Nan-hui 5 tsui. Chin-shan-wei (Chinshan), a walled city, lies about 30 miles west-south-westward of Nan-hui tsui.

Cha-p'u, an old Chinese city, is now little more than a fishing village ; it was formerly the port of Hang-chou, and its position may be known by a ridge of hills, the highest, Chen shan, being 513 feet 10 (156^m4) high, extending along the coast for about 3½ miles north-eastward of the city, as well as by the islets which protect the anchorage in the roadstead from the eastward ; on one of these islets, lying close to the coast about 2 miles eastward of the city is a prominent white house. Ts'ai-chi shan (Holley islet), the outermost 15 islet, lies about 1½ miles eastward of Cha-p'u and nearly one mile off-shore. Ta-meng shan is an islet lying about one mile east-north-eastward of Ts'ai-chi shan. A mud flat, which dries, extends as much as one mile from the coast between Cha-p'u and Hai-yen, situated about 8½ miles south-westward ; the outer edge of this flat is steep-to, 20 and sounding gives no warning. The tidal streams in the anchorage southward of Cha-p'u attain a rate of from 5 to 6 knots at spring tides. Cha-p'u is connected with the general telegraph system.

Lights.—Lights are exhibited on the summit of Ta-meng shan, and on the coast about 1½ miles west-north-westward of Ts'ai-chi- 25 shan (*Lat.* 30° 35' N., *Long.* 121° 07' E.).

Islets and dangers in Hang-chou wan.—Tung-ho (Tunghuo) shan (Nanho on chart 1124), situated about 11½ miles north-eastward of Fu-lung shan, is 199 feet (60^m7) high ; a shoal, with depths of less than 3 fathoms (5^m5) over it, extends about 2 cables north-westward 30 from it. Huang (Wang) chiao, 25 feet (7^m6) high, lies about three-quarters of a mile northward of Tung-ho shan ; foul ground extends nearly 2 cables northward and south-eastward from this rock.

Hsi-ho (Hsihuo) shan, situated about 3½ miles westward of Huang 35 chiao is 144 feet (43^m9) high ; an islet, 98 feet (29^m9) high, named Hsiao-hsi-ho, lies close off its south-eastern side, and another, named Hsi-pien-tan, close off its north-western side. Tung-pien-tan is a rock situated near the outer edge of foul ground extending half a mile eastward from Hsi-ho shan.

40 Ch'ang-t'an shan or Reef islands consists of a group of several islets and rocks, the largest of which, 77 feet (23^m5) high, is named Ta-ch'ang-t'an and lies about 2½ miles west-south-westward of Hsi-ho shan ; the islet next eastward to Ta-ch'ang-t'an is named Hsiao-ch'ang-t'an. These islets lie at the south-eastern end of an extensive 45 patch of foul ground, with numerous rocks which dry, and are surrounded by soft mud and quick sand. Ch'i-tzu-mei is a group of six islands lying on this foul ground within a distance of 3 miles northward of Ch'ang-t'an shan ; the largest of them, named Ta-mei tao, is 140 feet (42^m7) high.

50 *Chart 1124.*

East Seshan islands consist of a group of seven islets and some rocks, the largest of which, lying about 19 miles north-north-eastward of Ch'i-tzu-mei, is 271 feet (82^m6) high, and named Pai shan ; for details of the remainder the chart should be consulted.

Charts 2412, 1262, 1263.

Chart 1199.

Middle Seshan islands are a group of which the largest island, named T'an-hu shan, is situated nearly 5 miles west-north-westward of Pai shan, with several islets or rocks around. Chang-wang shan or House islet, situated about $2\frac{1}{4}$ miles south-westward of T'an-hu shan, is clifty; a small islet lies about one mile north-eastward of Chang-wang shan, and Yeh-wang shan, a rock, with foul ground for nearly a quarter of a mile around, lies about $1\frac{1}{4}$ miles south-eastward of Chang-wang shan. There are numerous fishing stakes between all these islets and the northern shore of Hang-chou wan. 10

West Seshan islands are a group of three situated about 10 miles south-westward of Chang-wang shan (*Lat.* $30^{\circ} 35' N.$, *Long.* $121^{\circ} 35' E.$) near the northern shore of the bay. Ta-chin shan, the largest and central island, is 298 feet (90^m8) high. A shoal, with a depth of 2 fathoms (3^m7) over it, lies about half a mile westward of Ta-chin shan. Foul ground lies between the two southern islands, and also extends 2 cables south-westward from the northern island. 15

Wang-p'an shan (Flat Fog) is an islet situated about 13 miles south-westward of Chang-wang shan; two small islets or rocks lie within half a mile southward of it. Shang-p'an shan (Gap Fog) consists of two small islets lying about $1\frac{1}{4}$ miles westward of Wang-p'an shan; the northern islet is 72 feet (21^m9) high. 20

Charts 1199, 3522.

Ch'ien-t'ang chiang.—Safe navigation for sea-going vessels ends near Chiu-wang-wei shan (Rambler island), which lies about $11\frac{1}{4}$ miles south-westward of Ts'ai-chi shan. Steamboats proceeding to Hang-chou should not start until half-tide; they will then, if able to steam 4 knots with a 3-knot minimum flood stream, reach Hai-ning, a distance of 23 miles from Chiu-wang-wei shan, before high water at that place. The best plan for ships' boats is to ground on the southern bank of the river, 3 miles westward of Hai-ning, as the junk shelters on the sea wall are hard. 30

The bore having passed, boats should proceed to the city as soon as they float, taking advantage of the following flood, and keeping on the northern bank of the river. The distance from the grounding place mentioned above to a safe position just eastward of Hang-chou is 18 miles. 35

Boats of more than 3 feet (0^m9) draught should not be used for communicating with Hang-chou.

Junks take three days going from Cha-p'u anchorage to Hang-chou, and shelter firstly in Bore Shelter bay, which lies on the northern bank of the estuary about 13 miles above Chiu-wang-wei shan, and secondly at Hai-ning grounding place. 40

The return from Hang-chou to Cha-p'u anchorage cannot be safely accomplished under three tides in any boat. A boat should leave Hang-chou immediately after the bore has passed, and secure at or opposite Hai-ning; after the next high water, proceed to Bore Shelter bay, and at the next high water after arrival there proceed to Cha-p'u anchorage. 45

Navigation between Bore Shelter bay and Cha-p'u anchorage is not safe in strong winds, on account of the violent overfalls. Boats should not start at night except with a pilot. 50

Bore of Ch'ien-t'ang chiang.—The bore of Ch'ien-t'ang chiang (kiang), which is probably one of the largest in the world, occurs on

Charts 2412, 1262, 1263.

Charts 1199, 3522.

every tide; at neaps, however, it is only from about 2 to 3 feet (0^m6 to 0^m9) high, and is neither so dangerous nor so spectacular as at springs, when it frequently exceeds a height of 10 feet (3^m0).

6 The following description is of a bore at springs:—

At full and change of the moon the bore originates between 1000 and 1030 in the vicinity of the meridian of Chi san, a prominent hill 12 miles east-south-eastward of Hai-ning, and on a still night it can be heard at Hai-ning half an hour after its formation. The
10 bore is composed of two branches; the main and higher branch keeps along the shore, touching the sea wall with its northern extremity, and the sands with its southern extremity; the other branch appears at Hai-ning from south-eastward, touching the sand on both sides. At 4 miles from Hai-ning the branches join, the
15 southern extremity of the first with the northern extremity of the second, making a continuous white line 2 miles in length. Shortly afterwards the bore commences to contract in width, increase in speed, and rise in height, conforming to the mouth of the river. At 2 miles from Hai-ning the flood stream, probably that from south-
20 eastward, which runs through the other, charges into the sea wall. There is no particular effect at the wall itself, but a violent rebound, causing a tumultuous rising of the water in waves several hundred yards behind and twice as high again as the front of the bore. These waves exist for many minutes, travelling southward or south-west-
25 ward, and subside on to the back of the bore. Usually, as the moon crosses the meridian, the bore passes Hai-ning, where it is nearly a straight line across the river, 9 cables wide, 8 to 11 feet (2^m4 to 3^m4) high, and travelling at a rate of from 12 to 13 knots; its front being a uniform sloping cascade of bubbling foam, falling forward and
30 pounding on itself and on the river before it at an angle of between 40° and 70°. The highest and steepest part is over the deep channel of the river.

Chart 3522.

The northern end of the bore swells up to the sea wall as it passes
35 along, but the southern end, meeting an incline of sand which only rises 19 feet (5^m8) in about 1½ miles, trails away in a tapering wall of breakers, which terminate half a mile in rear of the bore or where it passed 3 or 4 minutes previously. The river fills up to the level of the bore soon after it passes, but not evenly. The height, speed, and
40 regular appearance of the front are maintained for 15 miles above Hai-ning, after which the height decreases; the bore passes Hang-chou at 1345, soon after which it breaks up and disappears.

A quarter of an hour after the bore has passed Hai-ning (*Lat.* 30° 25' N., *Long.* 120° 32' E.), the water has risen 13 feet (4^m0); at 1400 it
45 has risen 18 feet (5^m5); it is high water at 1500, when the tide has reached a height of 19 feet (5^m8), and the stream at once commences to run out swiftly. At 1700 it is at the mean level; at 2000 it is nearly low water. The out-going stream, however, continues to run rapidly eastward until the arrival of the next bore. The water is at
50 its lowest for the 2 hours preceding the bore.

At Hai-ning the flood lasts 3 hours, the ebb 9 hours. At Hang-chou the flood continues 1½ hours, and is nearly all in the bore.

There is no place in the river where boats can be secured in safety 2½ hours after high water. All traffic between Hai-ning and Hang-

Charts 2412, 1262, 1263.

Chart 3522.

chou begins soon after the bore has passed, and ends 2 hours after high water, a period of from 3 to 4 hours.

On the southern bank of Ch'ien-t'ang chiang, the stream—at any rate for 5 or 6 miles inside the mouth of the river—commences to run out strongly an hour before high water at Hai-ning. 5

The bore abreast Hang-chou, if it occurs at all, is not regarded in any way dangerous for 15 or 20 days in the month. At Hai-ning the natives state positively that it comes with every flood tide, but that in calm weather and neaps it is only 2 or 3 feet (0^m6 or 0^m9) high. 10

The bore is probably always dangerous on account of its speed, and at springs it is most formidable. Navigation for ships is then impossible.

When the moon is in perigee at full or change, or when there are strong northerly or easterly winds in Chou-shan ch'ün-tao, the bore 15 generally arrives early off Hai-ning, travels at a greater speed than usual, and is also higher. The bores on the 8th, 9th, and 10th of October, 1892, the moon being in perigee on the 7th, and full on the 6th, were from 11 to 12 feet (3^m4 to 3^m7) high, and passed Hai-ning from half an hour to 1½ hour before the moon crossed the meridian, 20 travelling at a rate of from 13 to 14 knots. High water rose 22 feet (6^m7), or 1½ feet (0^m4) from the top of the seawall abreast the padoga.

The Chinese expect the highest bore on the 18th day of the 8th moon, which, in 1892, was the 8th of October, but the bore is not always greatest then. 25

Hang-chou.—Hang-chou (Hang-chau-fu), with a population, in 1952, of about 600,000, is situated on the northern bank of Ch'ien-t'ang chiang, 20 miles above its entrance, from which it is separated by a belt of clean sand about 2 miles in width, and it derives its importance chiefly from the fact that it is the capital of the province 30 of Chekiang. As such it is a political, administrative, educational, and social centre, rather than a commercial or industrial emporium. Although it taps the trade of Ch'ien-t'ang-chiang valley, a large proportion of the goods brought down that river is transhipped and taken by inland waterways to Shang-hai. 35

Hang-chou (*Lat.* 30° 16' N., *Long.* 120° 11' E.) is the southern terminus of Yün ho (The Imperial canal), the other end of which is at T'ien-ching.

There is railway communication with Yin-hsien and Shang-hai, and the city is connected to the general telegraph system. 40

Chart 1124.

SOUTHERN APPROACH TO CH'ANG CHIANG.—General remarks.—Between Chou-shan ch'ün-tao and the estuary of Ch'ang chiang or Yangtze kiang are numerous islands, divided into four main groups, namely:—Ch'ü shan (Tsu san) and its adjacent islands, 45 Chi-chu lieh-tao (Rugged islands), Pa-ko lieh-tao (Parker islands), and Ma-an lieh-tao (Saddle group). There are navigable passages between these groups, but the usual route for vessels bound for Ch'ang chiang is through Pai-chieh hsia (Bonham strait) (page 365).

Outside the main group of islands there are several small groups of 50 islands and dangers.

Outlying islands and rocks.—Lang-kang shan (Lukon islands) consists of a group of three uninhabited islands, from 243 to 313 feet

Charts 1199, 2412, 1262, 2347, 1263.

Chart 1124.

(74^m1 to 95^m4) high, the south-western and highest of which lies about 19 miles north-north-eastward of Tung-fu shan (page 334). The islands are barren and precipitous on their eastern sides, and
 5 rocks extend 2 cables off them in places; between the middle and south-western islands are two noticeable rocks, 99 feet (30^m2) and 66 feet (20^m1) high, respectively.

Wu chiao (Beehive), situated about 13 miles west-south-westward of Lang-kang shan, is a black, rugged rock, 46 feet (14^m0) high. A
 10 flat-topped rock, which dries 7 feet (2^m1), lies about 1½ cables south-eastward of Wu chiao, and a pinnacle rock, with a depth of 1½ fathoms (2^m7) over it, lies about 4 cables north-north-westward.

Tung-panyang chiao (Childers rock), situated about 11 miles north-north-westward of Lang-kang shan, is a pinnacle which dries 3 feet
 15 (0^m9); it is steep-to except on its northern side, where a narrow ledge, with a depth of 2 fathoms (3^m7) over it, extends about one cable. Sounding gives no warning of the rock, and even at half tide the sea does not break over it.

Tung tao (Barren islets) consists of three islets and a number of
 20 rocks; the western and largest islet is 150 feet (45^m7) high and lies about 20 miles north-north-eastward of Lang-kang shan (*Lat.* 30° 26' N., *Long.* 122° 56' E.). Foul ground extends about 6 cables south-eastward from the eastern islet, and terminates in a rock which dries 10 feet (3^m0), on which the sea breaks heavily. Heavy breakers,
 25 which were reported to have been seen about one mile southward of these islets, were unsuccessfully searched for in 1893, and it appears probable that these breakers were on the rock just mentioned.

An obstruction, with a depth of 4 fathoms (7^m3) over it, was reported, in 1946, about 1½ miles northward of the western and largest
 30 islet.

CH'Ü SHAN AND ADJACENT ISLANDS.—General remarks.—

This group is separated from the northern group of Chou-shan ch'ün-tao by a clear channel, from 6 to 8 miles wide, named Ch'ü Chiang. Ch'ü shan (Tsu san), the largest island of this group, lies
 35 with Worth point, its south-eastern extremity, about 13 miles west-north-westward of Wu chiao. The highest peak, 1,054 feet (321^m3) high, is situated in the south-western part of the island, and on this summit is a joss-house surrounded by a wall; the plains on the island are cultivated, and there is a large population, principally
 40 inhabiting the western and northern parts of the island, where there are numerous villages. The coasts are indented by numerous bays, but these are entirely filled by mud flats, on which are islets and rocks.

Ch'ü shan.—Coast.—Islands and dangers.—Anchorage.—The southern coast of Ch'ü shan is very irregular, with rocks close off
 45 several of its salient points. It is indented by a large bay about 5 miles westward of Worth point. An island, 322 feet (98^m1) high, named Hai-lo shan, lies in the entrance to this bay, which is filled with drying flats; an islet, 135 feet (41^m1) high, lies close southward of Hai-lo shan, with rocks between. The western entrance point to
 50 this bay is called Tz'u-t'ou tsui. Borrow head lies about one mile westward of Tz'u-t'ou tsui, and Pennell point, the south-western extremity of Ch'ü shan, lies about 1½ miles further west-north-westward.

Charts 1199, 2412, 1262, 2347, 1263.

Chart 1124.

Evans islets, situated off the western coast of Ch'ü shan, are a group of three islets close together, the largest of which is 126 feet (38^m4) high, and lies about three-quarters of a mile north-westward of Pennell point. McCauley islet, 102 feet (31^m1) high, lies about 2 miles 5 west-south-westward of Hay point, the north-western extremity of Ch'ü shan, and is nearly divided into two; a rocky islet, about 30 feet (9^m1) high, lies close north-westward of it. A bank, with depths of less than 3 fathoms (5^m5) over it, extends more than one mile offshore between Hay point and Briggs point, situated about one 10 mile southward.

A number of rocks, above and below water including a prominent black rock 56 feet (17^m1) high, lie up to half a mile offshore from one to 2 miles eastward of Hay point.

Croker point (*Lat.* 30° 28' N., *Long.* 122° 23' E.) is the eastern 15 extremity of a prominent promontory which extends about 1½ miles northward from about the middle of the northern coast of the island. An islet, 126 feet (38^m4) high, lies close inshore about one mile south-eastward of Croker point. Dyer islet lies close off the north-eastern point of Ch'ü shan and nearly 3 miles south-westward of Croker point. 20

The other islands northward and eastward of Ch'ü shan are described separately.

Anchorage in moderate depths can be obtained off almost any part of the island by vessels with local knowledge, and shelter can thus be obtained from any wind; anchorage near Pennell point, however, is 25 not recommended, as the tidal streams here attain a rate of from 5 to 6 knots at springs. Anchorage, available in a typhoon, may be had off the northern coast of the island, westward of the promontory on which Croker point is situated; this anchorage is sheltered by the islands lying northward of Ch'ü shan. 30

**Islands and dangers eastward of Ch'ü shan.—Passages.—Anchor-
ages.**—Balfour islands, separated from Ch'ü shan by Balfour passage, are a group of several islands with some islets and rocks, for details of which the chart should be consulted. Shu-lang-hu (Andrew island), the largest, is 548 feet (167^m0) high, and of a light colour; 35 a large fishing village is situated on the shore of Worth harbour, a shallow bay on the south-western side of the island, and at certain seasons fishing craft are numerous, as many as 1,200 having been in sight at one time from the anchorage. Vessels with local knowledge can obtain good anchorage, in depths of from 5 to 7 fathoms (9^m1 40 to 12^m8), sheltered from east to north-west, through north, with the western extremity of Shu-lang-hu bearing 334°, distant three-quarters of a mile; also in depths of from 5 to 6 fathoms (9^m1 to 11^m0), south-eastward of Francis island, 325 feet (99^m1) high, the south-western island of the group, sheltered from northerly winds. 45

Hai-heng-t'ou shan, the south-eastern island, is 321 feet (97^m8) high.

Balfour passage has depths of from 7 to 24 fathoms (12^m8 to 43^m9) in the fairway. Off the western point of Shu-lang-hu the passage is contracted to a width of about 3 cables by a pinnacle rock, with a 50 depth of 6 feet (1^m8) over it, lying about 1½ cables north-westward of this point; on the western side of the passage there is a small rock 2 feet (0^m6) high, with a rock which dries 2 feet (0^m6) close westward of it. An islet, 174 feet (53^m0) high, lies close inshore about half a

Charts 1199, 2412, 1262, 2347, 1263.

Chart 1124.

mile westward of the 2-foot (0^m6) high rock, with a rock, 75 feet (22^m9) high, between. When navigating Balfour passage vessels should pass fairly close to the 2-foot (0^m6) high rock.

- 5 Hobson islands are a group of three small island and some rocks lying eastward of Balfour islands. Some rocks, one of which is 4 feet (1^m2) high, lie about a quarter of a mile westward of Hsing shan, the western island, which is 216 feet (65^m8) high. Rocks also extend about 3 cables westward from Hsia-san-hsing (Elgar island),
 10 196 feet (59^m7) high, the eastern island of the group. Chung-san-hsing shan, the central island, is 245 feet (74^m7) high.

- The passage between Hobson and Balfour islands is fully three-quarters of a mile wide, and is deep in the fairway ; it is occasionally used by steam vessels, but the route eastward of Hsia-san-hsing is
 15 recommended.

Light.—A light is exhibited, at an elevation of 205 feet (62^m5), from a white circular tower 26 feet (7^m9) in height, on the eastern extremity of Hsia-san-hsing (*Lat.* 30° 26' *N.*, *Long.* 122° 31' *E.*).

- Islands and dangers northward of Ch'ü shan.**—**Passages.**—Hsia-hai shan (Parry island), lying about 1½ miles north-eastward of Croker point, is 228 feet (69^m5) high, rocky, and barren ; rocks lie close off the eastern and north-eastern points of this island. A rock, with a depth of 2 fathoms (3^m7) over it, lies about one mile westward of Hsia-hai shan.

- 25 The eastern of the two Simpson islands is 265 feet (80^m8) high and lies close northward of the promontory on which Croker point is situated ; a rock, which dries 8 feet (2^m4), lies in the passage between. A rock, 9 feet (2^m7) high, lies close north-eastward of the eastern Simpson island, and two rocks, above water, lie close off the northern
 30 side of the island ; a rock, awash, lies about half a mile northward of its northern point. The western and smaller Simpson island is 110 feet (33^m5) high, and lies about three-quarters of a mile further west-north-westward ; a pinnacle rock, with a depth of 4 feet (1^m2) over it, lies about 1½ cables eastward of this island, and a ridge of rocks,
 35 with a depth of 4 feet (1^m2) on the outer end, extends about one cable from its northern point

- Huang-tse shan (Beal island), 524 feet (159^m7) high, lies with its south-eastern extremity about one mile north-westward of the western Simpson island ; it is covered with grass and is inhabited. Elvy
 40 rock, 3 feet (0^m9) high, lies about half a mile north-north-eastward of the south-eastern point of the island.

- Dawson islands, situated between Huang-tse shan and the north-western extremity of Chü shan, comprise Sang-chih shan (Henry island) and numerous smaller islands, of which the majority lie
 45 together on a shoal with depths of less than 3 fathoms (5^m5) over it. The eastern islet, which is separated from the main group by a deep narrow channel, is 141 feet (43^m0) high. The western islet, 130 feet (39^m6) high, lies about 3 cables northward of Hay point, and is separated from the main group by a deep channel about half a mile
 50 wide ; foul ground, including a rock 11 feet (3^m4) high, extends about 4 cables west-north-westward from this islet. Paymaster passage lies between the western islet and the coast of Chü shan ; it is deep, but a depth of 3½ fathoms (6^m4), must be crossed westward of the islet. The dangers on the southern side of Paymaster passage were

Charts 1199, 2412, 1262, 2347, 1263.

Chart 1124.

described on page 359. The tidal streams in this passage are rapid.

Hsiao-chü shan (Bassett island), 653 feet (199^m0) high, situated about 2½ miles westward of Huang-tse shan, is covered with grass and stones, and is inhabited; a shore bank, with depths of less than 3 fathoms (5^m5) over it, extends about half a mile eastward, and also about a quarter of a mile westward, from the island. The two Smith islands lie between Huang-tse shan and Hsiao-chü shan; the western island is 127 feet (38^m7) high. The channel between Huang-tse shan and Hsiao-chü shan on the north, and Dawson islands on the south, has depths of from 6 to 24 fathoms (11^m0 to 43^m9) in the fairway, but it is usually encumbered with fishing nets; a rock with a depth of 6 feet (1^m9) over it, lies about one mile westward of the north-western point of Sang-chih shan and in the southern half of the channel.

CHI-CHU LIEH-TAO.—Dangers.—Anchorage.—Chi-chu lieh-tao (Rugged islands), the westernmost group of islands in the southern approach to Ch'ang chiang, lies north-westward of Hsiao-chü shan, from which it is separated by a clear channel about 6 miles wide; the group is inhabited by a fishing population.

This group, which covers a large area, contains about 30 islands of various sizes, as well as numerous rocks and dangers. Only the more important of these are mentioned in the following description; for details of the remainder, including the positions of tide-rips, the chart should be consulted.

Ta-yang shan (Da-yung san), the largest and highest island of the group, lies with its southern extremity about 10 miles west-north-westward of Hsiao-chü shan, and is covered with grass and cultivation; it has two prominent peaks, one, 678 feet (206^m6) high, on the southern part and the other, 630 feet (192^m0) high, on the western extremity of the island. The principal village is situated on the shore of the bay on the eastern side.

Huxley rock (*Lat.* 30° 34' N., *Long.* 122° 05' E.), with a depth of 2 feet (0^m6) over it, lies about three-quarters of a mile south-eastward of the southern point of Ta-yang shan; a rock, which dries 8 feet (2^m4), lies about 1½ miles eastward of this point. A rock awash lies about 3 cables northward of the northern point of Ta-yang shan.

Good anchorage can be obtained by vessels with local knowledge off the bay on the eastern side of Ta-yang shan, in depths of from 4 to 6 fathoms (7^m3 to 11^m0); when approaching the anchorage, the highest peak of Hsiao-yang shan (*see* below) bearing 337°, and just open eastward of the southern entrance point of the bay, leads about 3 cables eastward of Huxley rock.

Hsiao-yang shan (Tripoint island), situated about 2 miles north-north-westward of Ta-yang shan, has three peaks of nearly equal elevation about 450 feet (137^m2) high. Chiang-chun-mao (Spire islet), lying about half a mile south-eastward of the south-eastern point of Hsiao-yang shan, is a remarkable pinnacle 214 feet (70^m2) high. None of the other islands in the vicinity has any distinguishing feature.

Hu-hsiao-she (South-east Horn), 266 feet (81^m1) high, lying about 5 miles south-eastward of Hsiao-yang shan, is the easternmost island of the group; Ma-an shan, 250 feet (76^m2) high, lies about one mile

Charts 1199, 2412, 1262, 1263.

Chart 1124.

south-westward of it. Po-tao-tsui (North-east Horn), 301 feet (91^m7) high, situated about 1½ miles north-north-westward of Hu-hsiao-she, is the north-eastern island of the group. Pi-chia-men (Tan-ying-chau), 345 feet (105^m2) high, and Ta-chih-t'ou (Yi-pi-yun), 374 feet (114^m0) high, are situated, respectively, close south-westward and about 1½ miles westward of Po-tao-tsui.

T'ang-nao shan or Rugged island, (South-west Horn) 72 feet (21^m9) high, is the westernmost of a chain of islets extending about 4½ miles westward from Ta-yang shan; included in this chain are Ta-san-t'ang, 260 feet (79^m2) high, lying about one mile westward of Ta-yang shan; and Ta-shuang-lien shan, 140 feet (42^m7) high, lying about 1½ miles eastward of T'ang-nao shan. Pirates bay lies on the southern side of Ta-san-t'ang.

Hsiao-wu-kuei (North-west Horn), the north-western island of the group, lies nearly 4½ miles north-north-eastward of T'ang-nao shan (*Lat.* 30° 36' N., *Long.* 121° 58' E.), with several islets between, including Ta-wu-kuei and K'o-tzu shan, 239 and 193 feet (72^m8 and 58^m8) high, respectively. A 4-fathom (7^m3) patch lies about a quarter of a mile northward of Hsiao-wu-kuei. Ho-erh shih (Hoar rock), lying about three-quarters of a mile west-north-westward of Hsiao-wu-kuei, is a pinnacle with a depth of 4 feet (1^m2) over it.

Light.—Fog signal.—A light is exhibited, at an elevation of 95 feet (29^m0), from a white lantern on a white dwelling, 23 feet (7^m0) in height, on the western summit of T'ang-nao shan. *See view facing this page.*

A fog signal is occasionally sounded from the lighthouse.

Islets and rocks northward of Chi-chu lieh-tao.—Hsiao-ch'i shan (Hen and Chicks) is a precipitous islet, 132 feet (40^m2) high, lying about 4 miles northward of Hsiao-yang shan; its northern extremity is broken up into several rocks from 30 to 40 feet (9^m1 to 12^m2) high; two rocks, one 2 feet (0^m6) high and the other drying 7 feet (2^m1), lie within a distance of 2 cables northward of the islet.

Charts 1124, 1602.

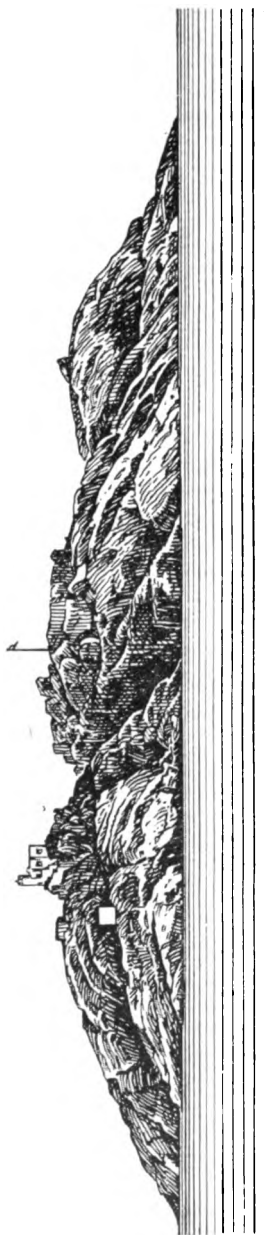
Ta-ch'i shan (Gutzlaff island), 261 feet (79^m5) high, lies about 8½ miles north-eastward of Hsiao-ch'i shan and is covered with vegetation. Sunken rocks lie within about 2 cables of its southern and western extremities, and a rocky ledge, terminating in a prominent black rock 9 feet (2^m7) high, extends about 2 cables eastward from the island. A rock, 35 feet (11^m0) high, lies about 4 cables northward of Ta-ch'i shan, and a rock, which dries 6 feet (1^m8), lies about one cable south-eastward of this rock. The landing place is on the western side of the island. *See view on chart 1124.*

Climatic table.—*See Chapter I, page 70.*

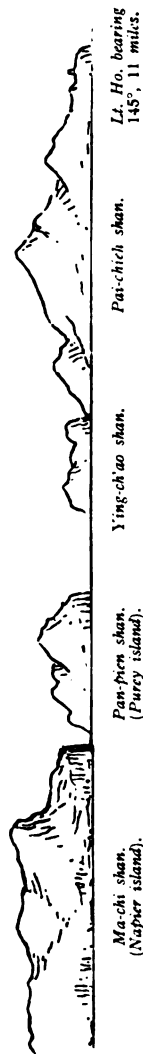
45 Anchorage.—Cables.—Communications.—Anchorage can be obtained, in a depth of about 6 fathoms (11^m0), about 4 cables off the landing place at Ta-ch'i shan, with the lighthouse (*see below*) bearing 064°, just open southward of a white hut on the south-western coast of the island. Telegraph cables are landed near a small cable house on the western side of the island, and vessels should not anchor in their vicinity. Vessels can communicate with the island by the International Code of Signals; it is connected to the general telegraph system.

Light.—Fog signal.—Radiobeacon.—Storm signals.—A light is

Charts 1199, 2412, 1262, 1263.



T'ang-nao shan (South-west Horn) from southward.
(Original dated 1932).



Ma-chi shan.
(Napier island).

Pan-hm shan.
(Pury island).

Ying-ch'ao shan.

Pai-chich shan.

Pa-ko lich-tao (Parker islands): Pai-chich shan (Bonham island) and adjacent islands.
(Original dated 1932).

Charts 1124, 1602.

exhibited, at an elevation of 274 feet (83^m5), from a white circular steel tower, 46 feet (14^m0) in height, situated on the eastern end of the summit of Ta-ch'i shan (*Lat.* 30° 49' N., *Long.* 122° 10' E.).

A fog signal is occasionally sounded and a radiobeacon is operated from the lighthouse. Storm signals are hoisted at the flagstaff near the lighthouse; *see* page 26. 5

Tidal streams.—At a position 4½ miles southward of Ta-ch'i shan, the streams are rotatory clockwise in accordance with the following table, which is referred to the time of high water at Yangtze approaches (Admiralty Tide Tables Standard Port) :— 10

Hours before.	Direction.	Rate.	Hours after.	Direction.	Rate.
6	077°	2 to 3 knots	0	266°	3 to 5 knots
5	140°	½ to 1 knot	1	267°	3 to 4 "
4	242°	1 knot	2	286°	3 to 4 "
3	255°	1 to 2 knots	3	312°	2 to 3 "
2	259°	2 to 3 "	4	352°	2 to 3 "
1	260°	3 to 4 "	5	027°	2 to 3 "
0	266°	3 to 5 "	6	067°	3 to 4 "

Chart 1453, plan of Parker islands.

PA-KO LIEH-TAO.—**General remarks.**—Pa-ko lieh-tao (Parker islands) are a group of many islands, islets, and rocks lying south-eastward of Ta-ch'i shan, with a clear passage, fully 10 miles wide, between. 15

The group is separated from Chi-chu lieh-tao by a clear passage about 5 miles wide, and from the islands northward of Ch'ü shan by a clear passage about 3 miles wide.

South-western part of Pa-ko lieh-tao.—**Dangers.**—**Anchorage.**—Hsü-kung tao (Morrison island), situated about 11 miles south-south-eastward of Ta-ch'i shan, is covered with rocks and grass, and has two sharp peaks 496 feet (151^m2) and 427 feet (130^m1) high, respectively; on the western side of the island there is a bay, completely filled by a mud flat, with a village at its head. There are several islets and rocks around Hsü-kung tao, including Ta-luan shan, 191 feet (58^m2) high, lying about 4 cables north-eastward, and K'o-tung-kua, an islet 197 feet (60^m0) high, about 3 cables southward. Hsiao-tung-kua, a rock 69 feet (21^m0) high, lies close south-westward of K'o-tung-kua, and Lung chiao, 30 feet (9^m1) high, lies about 6 cables eastward of the same islet. For details of the remainder, including the positions of tide-rips, the chart should be consulted. 20 25 30

Yu-ch'ih shih (Richardson rock), lying about 1½ miles north-north-eastward of the northern point of Hsü-kung tao, is a pinnacle with a depth of 3¼ fathoms (5^m9) over it; the sea does not break on it, and, except in calm weather, when it is marked by tide-rips, its position is not indicated in any way. A 5½-fathom (10^m1) patch lies about 5 cables southward of Yu-ch'ih shih. 35

Pi-t'ou chiao (Gangway rock), situated about 2½ miles southward of the southern point of Hsü-kung tao, is precipitous and has a sharp double summit, 99 feet (30^m2) high. Patterson rock (*Lat.* 30° 35' N., *Long.* 122° 16' E.), lying nearly a quarter of a mile southward of Pi-t'ou chiao, is a pinnacle with a depth of 3 feet (0^m9) over it. 40

Charts 1199, 2412, 1262, 2347, 1263.

Chart 1453, plan of Parker islands.

Ch'uan shan or Davis islands is a group of islands and rocks, lying together on a bank with depths of less than 3 fathoms (5^m5) over it; Shang-ch'uan shan, the western and highest island of this group is 5 469 feet (142^m0) high and lies about $2\frac{1}{4}$ miles eastward of Pi-t'ou chiao. Webb rock, lying about half a mile south-south-westward of the south-western point of Shang-ch'uan shan, is a pinnacle with a depth of 3 feet (0^m9) over it, and it is steep-to; except in calm weather, when there are tide-rips, the position of this rock is not 10 indicated in any way. Skinner rock, lying about 3 cables north-westward of the north-eastern point of Shang-ch'uan shan, has a depth of $1\frac{1}{2}$ fathoms (2^m7) over it, and is steep-to. Hsia-ch'uan shan, situated about three-quarters of a mile eastward of Shang-ch'uan shan, is a group of three islands almost connected to each other, of 15 which the central and highest is 292 feet (89^m0) high; a 3-fathom (5^m5) patch lies about 2 cables off its eastern side. Man-t'ou shan, 164 feet (50^m0) high, lies about three-quarters of a mile southward of Hsia-ch'uan shan, with Chiang-nan shan, 194 feet (59^m1) high, between. For details of other islets and rocks in the group, and the 20 positions of tide-rips, the chart should be consulted.

Anchorage can be obtained, in a depth of about 10 fathoms (18^m3), off the southern side of Shang-ch'uan shan, with the summit of that island bearing 357° , and Pi-t'ou chiao bearing about 275° and just open southward of the south-western point of the island; when approach- 25 ing this anchorage care must be taken to avoid Webb rock. When in the western semicircle of a typhoon, and unable to make the mouth of Ch'ang chiang, this is a convenient anchorage while waiting for the storm to pass; the tidal eddies are troublesome, but no swell is felt here.

30 Ch'ai shan (Pirie island), situated about one mile eastward of Hsia-ch'uan shan, is 214 feet (65^m2) high and precipitous; a remarkable thumb rock, 102 feet (31^m1) high, lies close off its southern extremity, and one cable further southward is a rock 40 feet (12^m2) high; a rock, 66 feet (20^m1) high, lies close off its north-western point. There 35 are tide-rips northward and southward of Ch'ai shan.

Andersen islets are three rocks lying close together, the middle and largest of which is 76 feet (23^m2) high and lies about three-quarters of a mile north-westward of Ch'ai shan; foul ground extends about 2 cables south-eastward from these islets, and terminates in a rock 40 which dries 4 feet (1^m2).

Pan-yang shan (The Button), situated nearly $2\frac{1}{4}$ miles northward of Ch'ai shan, is a black, rugged, rocky islet, about 36 feet (11^m0) high; a rock, with a depth of 5 feet (1^m5) over it, lies about one cable eastward of this islet (*Lat. $30^\circ 38' N.$, Long. $122^\circ 22' E.$*)

45 Pai-chieh shan (Bonham island), situated about $2\frac{1}{4}$ miles east-south-eastward of Pan-yang shan, is 381 feet (116^m1) high and precipitous on its eastern side; there is a fishing village on its northern side. The landing place is on the western side of the island. A shoal, with depths of less than 3 fathoms (5^m5) over it, on which is an island, 132 50 feet (40^m2) high, and several rocks, extends about half a mile north-westward from Pai-chieh shan. Ying-ch'ao shan, an island 207 feet (63^m1) high, is separated from the northern end of this shoal by a narrow passage with a depth of 10 fathoms (18^m3). Rocks extend about 2 cables southward from the southern extremity of Pai-chieh

Charts 1124, 1199, 2412, 1262, 2347, 1263.

Chart 1453, plan of Parker islands.

shan, and terminate in a rock 2 feet (0^m6) high. Feng shan, 59 feet (18^m0) high, lies nearly half a mile westward of Pai-chieh shan ; foul ground extends about 1½ cables south-westward from this islet, and terminates in Feng chiao (Bonham rock), which is awash. A 6-fathom (11^m0) patch lies about 6 cables westward of Feng chiao. There are tide-rips southward of Pai-chieh shan and northward of Ying-ch'ao shan. See view facing page 362.

Good anchorage can be obtained off the south-eastern side of Pai-chieh shan in depths of from 6 to 9 fathoms (11^m0 to 16^m5), sheltered from north-westerly winds. There is indifferent anchorage off the western side of the island in depths of from 6 to 9 fathoms (11^m0 to 16^m5), with the lighthouse (*see* below) bearing 132°, distant from 3 to 4 cables ; this anchorage is sheltered from northerly and north-easterly winds, but the tidal eddies are troublesome.

Pan-pien shan (Purey island), the western of the two Cust islands, is 243 feet (74^m1) high and lies with its north-western extremity about 1½ miles eastward of the north-eastern point of Pai-chieh shan. Several rocks, one of which is 5 feet (1^m5) high, lie within a distance of 2 cables south-westward of the south-western point of Pan-pien shan, and a rock, 12 feet (3^m7) high, lies about one cable off the south-eastern point of the island. A 9-fathom (16^m5) patch lies about 3 cables west-north-westward of the western end of Pan-pien shan. Hsiao pan-pien shan, the eastern island, is 194 feet (59^m1) high. There are tide-rips off the northern sides of both Cust islands.

T'i-lo chiao (Franklin rock) consists of some rocks lying close together about one mile south-eastward of the south-eastern point of Pan-pien shan ; the highest rock has a sharp summit 59 feet (18^m0) high.

Lights.—**Fog signal.**—A light is exhibited, at an elevation of 68 feet (20^m7), from a black circular concrete tower, 32 feet (9^m8) in height, situated on the eastern end of the summit of Pan-yang shan. A fog signal is sounded from the lighthouse.

A light is exhibited, at an elevation of 237 feet (72^m2), from a circular tower, 47 feet (14^m3) in height, painted red and white in horizontal bands, situated on the southern shoulder of Pai-chieh shan (*Lat.* 30° 37' N., *Long.* 122° 25' E.).

Pai-chieh hsia.—**Directions.**—Pai-chieh hsia (Bonham strait), situated between Ch'ai shan and Pan-yang shan, westward, and Pai-chieh shan and Ying-ch'ao shan, eastward, is a passage about 2 miles wide, through which a depth of 8 fathoms (14^m6) can be carried ; it is generally used by full-powered steam vessels bound for Ch'ang chiang from southward, or vice versa.

The lighthouse on Ta-ch'i shan (chart 1124) in line with the lighthouse on Pan-yang shan, bearing about 315°, leads through Pai-chieh hsia and about a quarter of a mile south-westward of a 6-fathom (11^m0) patch, described above, which is the outermost danger off the western side of Pai-chieh shan.

It is curious to note that whereas there is no record of any wreck at Pan-yang shan before the light was established in 1904, several accidents have happened since ; the explanation is that mariners sometimes fail to appreciate the strength and set of the cross-currents and pass too close to this island, whereas previously they gave it a wide berth. The dangerous tide-races through the strait seem to

Charts 1124, 1199, 2412, 1262, 2347, 1263.

Chart 1453, plan of Parker islands.

make vessels quite unmanageable if they pass too close to Pan-yang shan.

South-eastern part of Pa-ko lieh-tao.—Dangers.—Anchorage.—

- 5 Nan-ting-hsin (Brooke island), situated nearly $2\frac{1}{2}$ miles north-eastward of the eastern Cust island, is covered with grass and has a well defined summit, 381 feet (116^m1) high. An islet, 115 feet (35^m0) high, lies close off the north-western side of Nan-ting-hsin, and another, 177 feet (53^m9) high, lies close off its south-eastern point; foul
10 ground extends about a quarter of a mile eastward from the latter. Cortland rock, lying about 3 cables south-eastward of the southern extremity of Nan-ting-hsin, is awash. There are tide-rips around Nan-ting-hsin.

- Huang-lung shan (Senhouse island), 735 feet (224^m0) high, lies with
15 its western extremity about $1\frac{1}{2}$ miles eastward of Nan-ting-hsin; its southern and eastern coasts are bold and rugged. Some rocks lie within one cable of the south-eastern point of the island, and the outermost of these dries 5 feet (1^m5). Hsiao-mei-tzu, an islet, 138 feet (42^m1) high, lies about a quarter of a mile off the north-eastern
20 side of the island. Several islets and rocks lie off the south-eastern side of the island; Wai-pao chiao (The Nut), the outermost of these, lies about one mile eastward of the south-eastern point of the island and is 72 feet (21^m9) high and prominent. Chung-pao chiao, 115 feet (35^m0) high, and Nei-pao chiao, 122 feet (37^m2) high, lie between
25 Wai-pao chiao (*Lat.* $30^\circ 39' N.$, *Long.* $122^\circ 35' E.$) and Huang-lung shan.

- Hsiao-huang-lung shan (Bruce island), 536 feet (163^m4) high, lies close off the western side of Huang-lung shan and has three peaks. Huang-lung men, the narrow channel between these two islands is
30 not available for shipping, as the tidal streams are rapid and a bank, with depths of less than 3 fathoms (5^m5) over it, extends northward from its northern end to a line joining the northern points of the two islands.

- There are tide-rips off the salient points of Huang-lung shan and
35 Hsiao-huang-lung shan.

Small vessels can obtain anchorage between Hsiao-huang-lung shan and the northern part of Huang-lung shan, according to their draught, sheltered except from northerly winds, but there are numerous fishing stakes in this locality.

- 40 **Northern part of Pa-ko lieh-tao.—Dangers.—Anchorages.—**Ssu-chiao shan (Raffles island), the largest island of the group, lies with its south-eastern extremity about $1\frac{1}{2}$ miles northward of Hsiao-huang-lung shan; it has many peaks, the highest, at its south-western extremity, being 712 feet (217^m0) high. A slope of white
45 sand on the shore of the bay at the eastern end of the island is conspicuous, and shows in misty weather when little else can be seen.

- Wai-ma-lang shan, 191 feet (58^m2) high, situated about 2 miles westward of Hsiao-huang-lung shan, is the south-eastern of a group of islands, rocks and dangers extending about 2 miles off the western
60 half of the southern side of Ssu-chiao shan. The largest of the group is Ma-chi shan (Napier island), 361 feet (110^m0) high, which lies about three-quarters of a mile southward of the south-western extremity of Ssu-chiao shan, with Chung-chu shan, 289 feet (88^m1) high, between; there is an excellent boat harbour on its north-eastern side, and there

Chart 1453, plan of Parker islands.

are usually many junks here. Ma-lang, an islet, 145 feet (44^m2) high, lies about one mile north-westward of Wai-ma-lang shan, and Ch'i-kan shan and Ch'i-kan chiao, each 95 feet (29^m0) high, lie close inshore north-eastward of Ma-chi shan. Wai-ma-t'i chiao, 14 feet (4^m3) high, lying about three-quarters of a mile south-eastward of Ma-chi shan, is the outermost danger of the group. Ma-t'i chiao, 14 feet (4^m3) high, lies about half a mile northward of Wai-ma-t'i chiao. For details of the remainder, the chart should be consulted. There are tide-rips southward of Wai-ma-lang shan and Wai-ma-t'i chiao, and also off the western end of Ma-chi shan.

A bank, with depths of less than 3 fathoms (5^m5) over it, extends about 2 miles off the western coast of Ssu-chiao shan. Ch'ang-shan-t'ou, 56 feet (17^m1) high, is the northern of two islets lying close off the north-western extremity of Ssu-chiao shan; a 2 $\frac{1}{2}$ -fathom (5^m0) patch lies about one cable north-westward of it.

Elliot islands are a group of three islands, almost connected with each other, and a few islets and rocks; the southernmost island is 236 feet (71^m9) high and lies about 1 $\frac{3}{4}$ miles westward of the north-western point of Ssu-chiao shan. Pei-ting-hsin or Pei-ting-chin, the middle and largest island, is 466 feet (142^m0) high and precipitous on its eastern side. Hsia-ting-hsin, the northern island, is 263 feet (80^m2) high. Wang-wen shan is a group of four islets lying westward of Hsia-ting-hsin (*Lat.* 30° 46' N., *Long.* 122° 23' E.). Niu-wu chiao (Bisbee rock), lying nearly three-quarters of a mile south-south-westward of the southern island, is black, rugged, and 30 feet (9^m1) high. Lung chiao, a rock, 30 feet (9^m1) high, lies about half a mile eastward of the southern island and in the channel between Pei-ting-hsin and the north-western extremity of Ssu-chiao shan; for further details the chart should be consulted. There are tide-rips off the northern side of Hsia-ting-hsin. There is good anchorage, in depths of from 4 to 8 fathoms (7^m3 to 14^m6), in the channel between Pei-ting-hsin and Ssu-chiao shan.

Chin-chi shan (Chesney island), 430 feet (131^m1) high, is separated from the northern point of Ssu-chiao shan by a narrow boat channel; an islet, 118 feet (36^m0) high, lies close off its eastern point, and there is a good boat harbour within it. Ta-mao-hung, an islet, 174 feet (53^m0) high, lies about a quarter of a mile northward of the northern point of Chin-chi shan, with some rocks between and about a quarter of a mile off its western side; Hsiao-hsia-erh chiao, a group of rocks surrounded by tide-rips, one of them 12 feet (3^m7) high, lies about half a mile north-north-eastward of this islet. A chain of islets and precipitous rocks extends about 1 $\frac{3}{4}$ miles north-eastward from Ta-mao-hung, and the outermost of these is named Wai-ssu chiao (The Sentinels); for details of these the chart should be consulted. The islet, 63 feet (19^m2) high, lying about half a mile eastward of Ta-mao-hung, is called Hsiao-mao-hung. There are tide-rips in the passages through the centre of the above chain of islets and rocks.

A bank, with depths of less than 3 fathoms (5^m5) over it, extends about one mile off the western part of the northern coast of Ssu-chiao shan.

Tan-ts'ai hsü (Turret island), 100 feet (30^m5) high, lies about half a mile eastward of the south-eastern end of Ssu-chiao shan, with an islet, 128 feet (39^m0) high, close north-westward of it. There are

Charts 1124, 1602, 1199, 2412, 1262, 2347, 1263.

Chart 1453, plan of Parker islands.

tide-rips off Tan-ts'ai hsü, and also off the point situated about one mile further northward.

- 6 Anchorage can be obtained nearly all round Ssu-chiao shan, but the anchorage off the southern side is reported to be unsafe.

Lights.—A light is exhibited on the 196-foot (59^m7) high islet situated close north-westward of Wai-ma-lang shan. A light is exhibited on the north-eastern point of Ma-chi shan (*Lat.* 30° 41' N., *Long.* 122° 25' E.).

- 10 **Off-lying dangers.**—Wai chiao (Outpost rock), situated about 2½ miles eastward of Chin-chi shan, is 21 feet (6^m4) high; foul ground extends about 2 cables from its eastern side.

A 4½-fathom (8^m2) rocky patch lies about 1½ miles south-eastward of Wai chiao.

- 15 Pai-mou chiao, a rock awash, lies about 7 cables north-eastward of the north-eastern point of Ssu-chiao shan. Wai-pai-mou chiao (Cairnsmore rock), lying about 2½ miles eastward of this point is a pinnacle with a depth of one fathom (1^m8) over it; the sea never breaks on this rock, and it is not marked in any way except by tide-rips when the water is smooth.

Charts 1124, 1602.

- MA-AN LIEH-TAO.**—**General remarks.**—**Tidal streams.**—Ma-an lieh-tao (Saddle group), the easternmost of the four groups of islands in the southern approach to Ch'ang chiang, lies north-eastward of Pa-ko lieh-tao, from which it is separated by a clear passage from 3 to 5 miles wide. It is divided into two parts by a clear and deep passage, about 2 miles wide in its narrowest part, running in an east and west direction. *See* view on chart 1199. For tidal streams eastward of Ma-an lieh-tao, *see* Tables of Tidal streams on charts 1124 and 1602.

- 30 **Southern part of Ma-an lieh-tao.**—**Dangers.**—**Anchorage.**—Kou-ch'i (Chu-chi) shan (South Saddle), situated about 11 miles eastward of Ssu-chiao shan, has several peaks, one double summit in the northern part, 650 feet (198^m1) high, being, considerably higher than the others. *Chart 1124.*

- 35 Men-ch'ien chiao (*Lat.* 30° 42' N., *Long.* 122° 46' E.), a rock 23 feet (7^m0) high, with several rocks within a distance of 3 cables north-westward of it, lies nearly half a mile south-south-westward of the southern point of the island. Ma-an shan (Pony Saddle) is an islet, 223 feet (68^m0) high, lying about 4 cables off the western point of Kou-ch'i shan; is has a double summit, the western being a few feet higher than the eastern. Foul ground extends about 2 cables eastward from Ma-an shan, leaving a narrow passage, with a depth of 8 fathoms (14^m6) between it and Kou-ch'i shan. Huang-shih-tung (Whip), an islet 99 feet (30^m2) high, lies about one cable north-westward of Ma-an shan, with rocks between. A 6-fathom (11^m0) patch lies about one mile north-north-eastward of Huang-shih-tung.

Charts 1124, 1602.

- Rocks extend about 3 cables from the northern point of Kou-ch'i shan, and Tao-p'o chiao, an islet, about 60 feet (18^m3) high, lies off the north-eastern extremity of the island.

Chart 1124.

Ma-ku chiao (McCauley rock), with a depth of 4 fathoms (7^m3) over it, lies about 1½ miles westward of Ma-an shan.

Chart 1199, 2412, 1262, 2347, 1263.

Charts 1124, 1602.

Hsi-pan-yang chiao (Bit rock), lying nearly 4 miles westward of Ma-an shan, is a black, rocky islet 25 feet (7^m6) high; a rock, which dries 12 feet (3^m7), lies about 1½ cables south-eastward of this islet.

Ch'en-ch'ien shan (East Saddle) is separated from the eastern extremity of Kou-ch'i shan by a passage about 3 cables wide with a 2-fathom (3^m7) patch in the middle; foul ground, extending about 3 cables north-north-westward from the western point of Ch'en-ch'ien shan, lines the eastern side of this passage. The tidal streams are rapid through this passage, and it should not be used. The highest peak, 706 feet (215^m2) high, is in about the middle of the island, and about 4 cables eastward of this peak is a remarkable boulder, at an elevation of 677 feet (206^m3), which is conspicuous from northward and southward. The coasts of the island, especially the eastern, are rocky and precipitous. Yu-t'a, an islet 148 feet (45^m1) high, lies close off the north-eastern point of the island, and there is a 10-fathom (18^m3) patch about three-quarters of a mile northward of it. The island is inhabited, and there is a village, with a boat harbour, at its western end.

Alacrity anchorage, described below, is the principal anchorage in this part of the group. Should a south-easterly gale be experienced shelter may be obtained off the north-western side of Kou-ch'i shan. North-westerly gales, with heavy squalls, have been ridden out in the bay on the eastern side of Ch'en-ch'ien shan.

Light.—A light is exhibited from a white concrete structure with its upper part circular and lower part square, 16 feet (4^m9) in height, on Tao-p'o chiao (*Lat.* 30° 44' N., *Long.* 122° 47' E.).

Chart 1453, plan of Alacrity anchorage.

Alacrity anchorage.—**Islets and dangers.**—**Caution.**—**Tidal streams.**—Alacrity anchorage, situated in the bight between Kou-ch'i shan and Ch'en-ch'ien shan, southward of the narrow passage between these two islands, affords good shelter with winds from east to west, through north, in depths of from 7 to 10 fathoms (12^m8 to 18^m3), stiff mud. A considerable swell sets into the bay when the wind is southward of east or west; when this happens at spring tides a vessel becomes tide-ride and should leave. A good mark for entering the eastern part of the anchorage is the conspicuous boulder on Ch'en-ch'ien shan in line with the centre of the prominent beach of Yü wan (Godwin cove), bearing about 032°; there are no known dangers in this part, and the depths decrease gradually towards the shore.

A bamboo flagstaff stands about half a mile westward of the conspicuous boulder; a white house and a stone tower stand about 2½ and 3½ cables south-westward, respectively, of the flagstaff. In 1948 there was a white-wash mark on the cliffs about 8½ cables southward of the conspicuous boulder.

Ta-kung shan (the northern of the two Hoofs), an islet 156 feet (47^m5) high, lies about half a mile south-eastward of Hewitt point, the western entrance point; a reef, which dries 10 feet (3^m0), lies close off the northern point of this islet. An islet, 64 feet (19^m5) high, lies about one cable southward of Ta-kung shan. An islet, 40 feet (12^m2) high, lies about 1½ cables south-eastward of Hewitt point.

A 7-fathom (12^m8) patch lies about 1½ cables northward of Ta-kung shan.

Charts 1199, 2412, 1262, 2347, 1263.

Chart 1453, plan of Alacrity anchorage.

Landing is difficult at all times, and there is a constant scend of from $1\frac{1}{2}$ to $2\frac{1}{2}$ feet (0^m4 to 0^m7) ; the only place where it is always feasible is Studd harbour, a small inlet on the western side of the bay, 5 Walker rocks, 6 feet (1^m8) high, lie off the entrance to Studd harbour. Baker rocks lie about 6 cables north-eastward of Walker rocks, and one of them is 63 feet (19^m2) high. A 5-fathom (9^m1) rocky patch, lies about $2\frac{1}{4}$ cables off the south-western point of Ch'en-ch'ien shan. A $3\frac{3}{4}$ -fathom (6^m9) patch, and a rock, with a depth of less than 6 feet 10 (1^m8) over it, lie, respectively about 2 cables southward and 4 cables westward of Baker rocks ; a $3\frac{1}{2}$ fathom (6^m4) rocky patch, lies close north-westward of the latter. Owing to the imperfect nature of the survey, the plan must be used with caution.

This anchorage is the resort of numerous fishing craft, which at 15 times fill the bays out to the depth of 8 fathoms (14^m6).

The maximun rate of the tidal streams at spring tides is from $2\frac{1}{2}$ to 3 knots, but the further in a vessel anchors the less tidal stream she will experience ; it is only near spring tides that the streams are strong enough to swing a vessel against a moderate breeze.

20 **Light.**—A light, the position of which is approximate, is occasionally exhibited, at an elevation of 244 feet (74^m4), from a grey stone dwelling situated near the southern extremity of Ch'en-ch'ien shan ; a white tower stands a short distance north-north-eastward of the stone dwelling.

25 *Charts 1124, 1602.*

North-western part of Ma-an lieli-tao.—Dangers.—Anchorages.

Peng chiao (Spur), situated about 2 miles northward of Hsi-pan-yang chiao, is a vertical rock 60 feet (18^m3) high, like a mile-stone, and a rock above water lies close northward of it. T'ai-nan shan (South 30 Stirrup), 119 feet (36^m3) high, lies about half a mile north-westward of Peng chiao (*Lat. $30^{\circ} 45' N.$, Long. $122^{\circ} 40' E.$*), and a rock, which dries 4 feet (1^m2), lies about $1\frac{1}{2}$ cables northward of this islet.

Hsia-san-heng shan, situated about half a mile north-north-westward of T'ai-nan shan, and Shang-san-heng shan, lying about 35 half a mile further westward, are rugged islets, known as Mid Stirrups; the former consists of two islets, 119 and 99 feet (36^m3 and 30^m2) high, respectively, and the latter of three islets, the highest 109 feet (33^m2) high. A pinnacle rock, with a depth of $1\frac{1}{2}$ fathoms (2^m3) over it, lies nearly half a mile east-north-eastward of Hsia-san-heng shan, with 40 a $2\frac{3}{4}$ -fathom (5^m0) patch about one cable northward of it.

Ch'ih-ch'ih shan, Chiu-tzu (Pai-tzu) shan, and Tung-p'u shan, 256, 214, and 243 feet (78^m0 , 65^m2 , and 74^m1) high, respectively, are three islands, known as North Stirrups, lying in a north and south direction. Ch'ih-ch'ih shan, the southernmost, lies about one mile 45 north-eastward of Hsia-san-heng shan ; Chiu-tzu shan, the middle island, has a remarkable boulder, at an elevation of 173 feet (52^m7) about $1\frac{1}{2}$ cables north-eastward of its summit ; between this island and Tung-p'u shan are many rocks, one of which is 30 feet (9^m1) high. An isolated 8-fathom (14^m6) patch, lies about a quarter of a 50 mile southward of the western end of Ch'ih-ch'ih shan.

Lü-hua shan (Side Saddle) consists of two inhabited islands connected to each other by a rocky ledge, which can only be crossed by boats at high tide and slack water ; Tung-lü-hua shan, the eastern island, lies with its eastern point nearly half a mile northward of

Charts 1199, 2412, 1262, 2347, 1263.

Charts 1124, 1602.

Tung-p'u shan, and is 470 feet (143^m3) high. Two rocks, which dry 12 feet (3^m7) and 8 feet (2^m4), respectively, lie about 2 cables off the southern coast of Tung-lü-hua shan, which has an islet, 122 feet (37^m2) high, close off its northern point. Hsi-lü-hua shan, the western 5 island, is 338 feet (103^m0) high, and has an islet, 164 feet (50^m0) high, close of its western point; a rock, 24 feet (7^m3) high, with a smaller rock close north-westward of it, lies about 4 cables off the northern coast of this island.

The Buckles are a group of four islets and some rocks lying in a 10 general north and south direction westward of Lü-hua shan. The southernmost islet, which is the most prominent, has a conical summit 142 feet (43^m3) high; a rock, with a depth of 3 fathoms (5^m5) over it, lies about 1½ cables south-westward of its southern extremity. The two southern islands lie close together on a shoal 15 bank. Hsiao-man shan (*Lat. 30° 49' N., Long. 122° 36' E.*), the next island northward, is 125 feet (38^m1) high. Ta-man shan, the northernmost island, from which foul ground extends about 1½ cables south-westward, is 96 feet (29^m3) high. Giffard rock, lying about 3½ cables westward of Ta-man shan, dries 8 feet (2^m4). 20

Good anchorage can be obtained by vessels with local knowledge, in moderate depths, northward and southward of Hsi-lü-hua shan, and also in the bay on the western side of Tung-lü-hua shan. The anchorage southward of Hsi-lü-hua shan is very secure with winds between west and east, through north. 25

North-eastern part of Ma-an lieh-tao.—Dangers.—Anchorages.—

Huang chiao (Crupper islands) consists of a group of three islets and numerous rocks, the middle and largest of which lies about 3½ miles east-north-eastward of Peng chiao. Chung-huang chiao, the middle islet, is 178 feet (54^m2) high, and is precipitous on its southern and 30 western sides. Hsia-huang chiao, the eastern islet, is 66 feet (20^m1) high. Shang-huang chiao, the western islet, is 63 feet (19^m2) high. Rocks, drying 10 feet (3^m0), lie about 1½ cables northward of Chung-huang chiao. There is foul ground in the passages between the islets. 35

A 5½-fathom (10^m1) rocky patch, lies about 6 cables south-westward of Shang-chuang chiao, and isolated depths of 9 and 10 fathoms (16^m5 and 18^m3), lie respectively, about half a mile southward and 1½ miles westward of the same islet.

Chang hsü (Pillion island) lies about 1½ miles north-westward of 40 the middle islet of Huang chiao; a remarkable needle-rock, 19 feet (5^m8) high, lies near its southern end. Three rocks above water lie within a distance of about a quarter of a mile southward of the island; two of these are pillar rocks, about 60 feet (18^m3) high, called The Pommels (*Lat. 30° 47' N., Long., 122° 43' E.*). There are two 45 detached 8-fathom (14^m6) patches about 6 cables southward of the island.

Hsiao-ch'ing shan (Girth), 138 feet (42^m1) high, lies nearly three-quarters of a mile northward of Chang hsü; a rock, which dries 4 feet (1^m2), lies about a quarter of a mile southward of this islet, and a rock, 50 which dries 7 feet (2^m1), lies 1½ cables south-eastward of the islet, with another drying rock about one cable southward of it. Two rocks which dry 4 and 5 feet (1^m2 and 1^m5), lie about one and 1½ cables, respectively, north-westward of Hsiao-ch'ing shan. There are

Charts 1124, 1602.

tide-rips between Hsiao-ch'ing shan and Chang hsü. Ta-ch'ing shan (Martingale), 142 feet (43^m3) high, lies about 4 cables north-westward of Hsiao-ch'ing shan ; a shoal, with a depth of 2½ fathoms (4^m1) over
5 it, lies about one cable southward of it.

Hung chiao (Powell rock), which dries 6 feet (1^m8), lies about one mile westward of Ta-ch'ing shan (*Lat. 30° 49' N., Long. 122° 42' E.*) ; an isolated depth of 8 fathoms (14^m6) lies about half a mile southward of this rock. Chi-lung shan (Curb), situated about three-quarters of
10 a mile north-north-westward of Ta-ch'ing shan, is 211 feet (64^m3) high and has steep rocky sides and a sharp summit ; there are tide-rips off the southern side of this island.

Chi-hsia (Pi-hsia) shan and Yeh-mao-tung are two islands, known as False Saddle, separated from each other by a narrow boat passage ;
15 Chi-hsia shan, the south-eastern of the two, lies about 2 miles east-north-eastward of Huang chiao ; both islands are inhabited. Chi-hsia shan is 322 feet (98^m1) high and precipitous on its northern side ; Yeh-mao-tung has a saddle-shaped summit, 529 feet (161^m2) high. Yang-she-tsui (Blinkers) is an islet, 83 feet (25^m3) high,
20 lying about 4 cables south-eastward of Chi-hsia shan, with rocks between and 2 cables further south-eastward ; the outermost rock is 3 feet (0^m9) high, and in fresh winds there are heavy tide-rips off it. Rocks extend about one cable off the western side of Chi-hsia shan.

A rock, 69 feet (21^m0) high, lies about one cable off the south-
25 western end of Yeh-mao-tung, and an islet, 148 feet (45^m1) high, lies close off its north-western extremity. There is a good anchorage for vessels with local knowledge, in depths of from 4 to 6 fathoms (7^m3 to 11^m0), mud, in the bay formed between the western side of Chi-hsia shan and the southern side of Yeh-mao-tung ; this anchorage
30 is sheltered from winds from between north-west and east, through north.

Ta-p'an shan, situated close north-westward of Yeh-mao-tung, is 424 feet (129^m2) high and the south-eastern of Bridle islands ; Chang-han shan, 158 feet (48^m1) high, the north-western island of this group
35 lies about one mile further north-westward, with Hsiao-p'an shan, 164 feet (50^m0) high, and several islets and rocks, between. A rock, which dries 7 feet (2^m1), lies about one cable off the north-eastern side of Ta-p'an shan. Hu-ti shan (Rein) situated about 6 cables westward of Chang-han shan, is 188 feet (57^m3) high and has a
40 double summit ; rocks above water extend about 1½ cables from its northern side ; Lao-hu shan, a group of rocks above water, lies close off its south-eastern side.

Outlying shoal.—A 49-foot (14^m9) patch lies about 6½ miles east-north-eastward of Yang-she-tsui (*Lat. 30° 46' N., Long. 122° 48' E.*).

45 **Northern part of Ma-an lieh-tao.**—**Dangers.**—**Beacons.**—**Anchorage.**—Hua-niao shan (North Saddle) the northernmost island of Ma-an lieh-tao, is covered with rocks and grass and has a saddle-shaped summit, 781 feet (238^m0) high ; the coasts are rugged and in many places precipitous. The island is inhabited. Shan chiao
50 (Churchill rocks) is a group of rocks extending about half a mile south-eastward from the south-eastern point of the island ; it includes a rock 21 feet (6^m4) high, and the outer rock dries 4 feet (1^m2). There are tide-rips northward of Shan chiao. Tsai-ch'i shan (Snaffle), 132 feet (40^m2) high, lies about 3 cables off the south-

Charts 1199, 2412, 1262, 2347, 1263.

Charts 1124, 1602.

eastern side of the island, and about half a mile from Chi-lung shan. Pai chiao (Split island), situated about half a mile off the north-eastern extremity of the island, with foul ground between, is a precipitous rock, 181 feet (55^m2) high. Foul ground extends about 5 about one cable off the western entrance point to North bay, which lies on the northern side of the island. Some rocks, including one 60 feet (18^m3) high, lie close off the eastern side of the northern point of the island, on which two pairs of beacons are situated. Two rocks, which dry 5 feet (1^m5), lie about 3 cables westward of the 10 northern point of the island. Tao-pien, a rock 60 feet (18^m3) high, lies close off the western extremity of the island.

Vessels with local knowledge can obtain anchorage, in moderate depths, in North bay, South bay, or Huo-pa wan (West Bay.) North bay is generally used, but in spring and late autumn northerly winds 15 set in without much warning, and departure may be necessary at short notice. A heavy swell sets into South bay, and it is not a good anchorage with winds from between south and north-north-east, through east; the tidal streams are strong.

Light.—Fog signal.—Radiobeacon.—A light is exhibited, at an 20 elevation of 273 feet (83^m2), from a white circular tower with a black upper part, 54 feet (16^m5) in height, situated on the northern extremity of Hua-niao shan (*Lat. 30° 52' N., Long. 122° 40' E.*).

A fog signal is sounded from the lighthouse, and a radiobeacon is operated. 25

Charts 1199, 2412, 1262, 2347, 1263.

CHAPTER VII.

THE APPROACH AND ESTUARY OF CH'ANG CHIANG. HUANG-P'U CHIANG
AND SHANG-HAI HARBOUR*Chart 1602.*

ESTUARY OF CH'ANG CHIANG.—General remarks.—Ch'ang chiang or Yangtze kiang enters the sea northward of Nan-hui tsui (page 353) by three channels, but only one of these, namely Nan shui-tao (South channel), is available for sea-going vessels.

Nan shui-tao is bounded south-westward by the main coast between Nan-hui tsui (*Lat. 30° 53' N., Long. 121° 53' E.*) and the entrance to Huang-p'u chiang (Whangpoo river), situated about 35 miles north-north-westward, and north-eastward by some partly drying flats, on which are several low islands; these flats terminate eastward in T'ung-sha ch'ien-t'an (banks).

Pei shui-tao (North channel) is entered between T'ung-sha ch'ien t'an and She shan (Shaweishan), an island situated about 37 miles north-north-eastward of Nan-hui tsui; the channel then leads between the southern side of Ch'ung-ming tao (Tsunghming island) and the northern side of the flats and islands which form the north-eastern side of Nan shui-tao. This channel is changeable and not adequately buoyed.

Chart 1199.

Hai-men shui-tao (North entrance), situated along the northern side of Ch'ung-ming tao, is not marked in any way and is only used by junks; no further description will be given of this channel. Ch'ung-ming tao is low and highly cultivated, with numerous creeks.

Considerable alterations are constantly taking place in the estuary of Ch'ang chiang, which drains a very large area and is subject to periodic inundations; the most constant part of the river is the entrance to Nan shui-tao, but even this channel is subject to change.

Chart 1602.

Depths.—It was reported, in 1945 that it was safe for vessels of 29 feet (8^m8) draught to enter Ch'ang chiang through Nan shui-tao at high water at any time, and vessels drawing 32 to 33 feet (9^m8 to 10^m1) can enter at high water springs. At low water neaps, draughts of 24 or even 25 feet (7^m3 or 7^m6) can be taken through the channel, while at low water springs, as little as 19 to 20 feet (5^m8 to 6^m1) may be found.

At half tide (roughly 2½ hours before high water at any stage) there is a normal minimum depth of 26 feet (7^m9) in Nan shui-tao except during violent north-westerly gales.

Charts 2412, 1262, 2347, 1263.

Chart 1602.

Cables.—Very large numbers of submarine cables, which are indicated on the chart, are laid in the estuary of Ch'ang chiang and its approaches. See page 37.

Tidal streams.—The tidal streams in the approaches to Ch'ang 5
chiang, from Ta-ch'i shan (page 362) to She shan, are rotatory clockwise, and their directions change as described below. Similar rotatory streams have been observed for 120 miles northward of the entrance to Ch'ang chiang, and 70 miles offshore.

The stream, from 6 hours until 3 hours before high water, sets in 10
directions from southward to westward, and from 3 hours before until high water from westward to northward; from high water until 3 hours after high water, in directions from northward to eastward, and from 3 hours after until 6 hours after high water, from eastward to southward. The high water referred to is the time of 15
local high water at the position in question. This time can be estimated from the differences given in Admiralty Tide Tables and the predicted times of high water at Yangtze approaches or Woosung (Admiralty Tide Tables Standard Ports). Near the land, or in a locality where a strong wind has been blowing for some time in one 20
direction, or during freshets in the rivers, the above rule may need modification, but as a broad guide it is useful.

During its revolution the direction of the stream changes near Niu-p'i chiao (*Lat. 31° 09' N., Long. 122° 15' E.*) about 20° every hour, except when turning from 315° to 022° soon after high water, and 25
from 135° to 225° about 6 hours after high water, when the change is more rapid.

The rate of the stream varies with the age of the moon between one and 4 knots.

The tidal information given on chart 1602 is a good guide to the 30
streams, and when navigating in Ch'ang chiang approach the course and distance run should be corrected each hour, or oftener, for their set, and this should never be neglected. The direction of the stream, as given therein, is seldom much in error, but the rate is a matter of judgment, and can only be correctly approximated by a careful 35
consideration of all attendant circumstances.

The set on the bank on the southern side of the river entrance, which occurs from about 5 to 7 hours after high water, must be guarded against when entering Ch'ang chiang. In strong northerly winds this southerly set is frequently felt as far within the entrance 40
as the covered portion of T'ung-sha ch'ien-t'an.

At a position about 7.4 miles 105°, from Shen-t'an Middle beacon (page 378) the out-going stream is strongest from 1½ to 3½ hours after high water at Woosung, when it sets south-eastward at a maximum rate of 6 knots during spring tides, and of 3½ knots during 45
neaps; the in-going stream is strongest from 4½ to 3½ hours before high water at Woosung, when it sets west-north-westward at a maximum rate of 3 knots during springs, and of 2 knots during neaps.

In Nan shui-tao the streams turn quickly, the stream setting north-westward commencing 5½ hours, and the stream setting 50
south-eastward half an hour before high water at Woosung. There is very little slack water, and at spring tides the stream setting south-eastward traverses a distance of 24 miles during the whole tide, the maximum rate of 5 knots being attained from 3 to 4 hours after

Chart 1602.

high water at Woosung. The rate of the stream setting north-westward seldom exceeds 4 knots, the distance run during the whole tide being 16 miles.

- 6 Between a position about 7.4 miles 105°, from Shen-t'an Middle beacon and Wu-sung (Woosung) the tidal streams are considerably stronger in the navigable channel than to seaward, owing to the water being confined within narrower limits by the banks.

- 10 With a fresh southerly wind the stream in the vicinity of a position about 7.4 miles, 105°, from Shen-t'an Middle beacon, and for a considerable distance further eastward, sets northward of east much longer after high water than in calm weather; with a fresh northerly wind the reverse is the case.

- 15 During north-easterly winds the stream sets north-westward for a longer period and the level of the water is higher than usual; during south-westerly winds the reverse is the case. South-easterly winds also raise the level of the water. Generally, the prevailing winds and weather modify to a great extent the regularity of both the times of high and low water, and the duration, direction, and rate of the

- 20 streams.
- Caution is necessary in all Ch'ang chiang approaches, especially in thick weather, as the tidal streams are sometimes abnormal, both in rate and direction.

- 25 **Pilotage.—Signals.**—Foreign vessels or Chinese vessels of more than 5,000 tons must apply to the Harbour-master for a pilot before entering or leaving the port. If in danger and wishing to take shelter in the port, application for a pilot may be made by radio direct to the pilot station, but application to enter the port must still be submitted to the Harbour-master in due course.

- 30 The pilot vessel is usually stationed at the mouth of Ch'ang chiang. The signals for a pilot are :—

By day.—A white and red square flag, upper half white.

By night.—A white light over a red light, both visible all round.

- 35 **Caution.**—Ch'ang chiang has been defined as a "narrow channel" within the meaning of Rule No. 25 of the "International Regulations for Preventing Collisions at Sea," from I-ch'ang in latitude 30° 42' N., longitude 111° 17' E., to a line joining Nan-hui tsui with a position in latitude 31° 00' 30" N., longitude 122° 07' 30" E., and thence in a straight line to She-shan lighthouse (*Lat. 31° 25' N., Long. 122° 14' E.*).

- 40 The "International Regulations for Preventing Collisions at Sea" are binding on Chinese vessels of foreign type.

- Outer anchorage.**—In fine weather there is anchorage anywhere between Ma-an lieh-tao, Ta-ch'i shan, and Chi-ku chiao (*see below*). Caution, however, is necessary when anchoring in the approaches to
- 45 Ch'ang chiang, as owing to the rotatory nature of the tidal streams, their direction and rate is not exactly known, and there is danger of parting the cable.

- Off-lying island and rocks.—Buoy.**—Ta-ch'i shan, situated about 16 miles east-south-eastward of Nan-hui tsui, has been described on

- 50 page 362.
- Chi-ku chiao (Amherst rocks), situated about 24 miles north-north-eastward of Ta-ch'i shan, is a group of dark rocks, the largest of which is 26 feet (7^m9) high. Numerous fishing boats are generally cruising in the vicinity of Chi-ku chiao, and fishing nets, indicated by

Charts 1199, 2412, 1262, 2347, 1263.

Chart 1602.

the bamboo framework which supports them, are laid out ; at night it is almost impossible to avoid them, and the locality should be given a wide berth.

A rock, with a depth of less than 6 feet (1^m8) over it, the existence of which is doubtful, was reported, in 1948, about 1½ miles south-south-eastward of Chi-ku-chiao. 5

An obstruction was reported, in 1948, about 5½ miles eastward of Chi-ku chiao.

Niu-p'i chiao lies nearly 7 miles west-south-westward of Chi-ku chiao ; the shoalest head is awash. A red and black chequered whistle-buoy is moored about 2 cables south-south-eastward of this rock ; owing to its exposed position this buoy is liable to drag. 10

She shan (Shaweishan), situated about 16½ miles north-north-westward of Chi-ku chiao is 196 feet (59^m7) high and has steep sides ; 15 rocks extend about 3 cables from its southern side. From north-north-eastward the island appears flat-topped, with the highest part eastward ; from eastward it appears as a peak ; and from about 5 miles south-eastward it appears like two islands, the western being the smaller. She shan (*Lat.* 31° 25' N., *Long.* 122° 14' E.), is seldom 20 sighted by vessels entering Ch'ang chiang from southward. Ch'ung-ming ch'ien-t'an (Tsungming banks) extend westward from the island to the eastern coast of Ch'ung-ming tao.

Light-vessel.—**Light.**—**Fog signals.**—**Radiobeacon.**—A light-vessel, with its hull painted red and the lower half of the light-tower and 25 bell-tower painted white, and with "Ch'ang-chiang k'ou" on her sides in Chinese characters, is moored about 7½ miles south-south-westward of Chi-ku chiao ; this light-vessel exhibits a light, at an elevation of 30 feet (9^m1), from a tower. A fog bell is rung by the motion of the vessel, but with a smooth sea this signal is unreliable. 30

A light is exhibited, at an elevation of 226 feet (68^m9), from a black circular tower, 55 feet (16^m8) in height, on the summit of She shan ; the keepers' dwelling is white. A fog signal is sounded from the lighthouse, and a radiobeacon is operated.

Nan-hui tsui.—**Tidal streams.**—Nan-hui tsui, the southern point 35 of the estuary of Ch'ang chiang is formed by alluvial deposit from this river. About a mile inside the high water line of this cape is an embankment, about 7 feet (2^m1) high, which runs northward parallel to the coast ; it also runs westward, but is less regular in direction here. Many mounds of mud, from 10 to 14 feet (3^m0 to 4^m3) high, stated by the natives to be graves, exist close outside the embankment about 6 miles westward of the cape ; the ground is very swampy. Inside the embankment there are numerous hamlets, and the land is well cultivated. The cape is probably extending eastward ; reeds grow up quickly, and hold the mud deposited by the floods. 45 In 1937, less water was reported about 2½ miles southward of the cape.

The tidal streams southward of Nan-hui tsui set parallel to the coast ; the west-going stream begins about one hour after low water at Yangtze approaches (Admiralty Tide Tables Standard Port), and the east-going stream about one hour after high water. The maximum rate at spring tides is 6 knots, and 3 knots at neap tides. 50

Nan shui-tao.—**Caution.**—**Islands and banks.**—**Beacons.**—**Shoal.**—The banks and depths in the vicinity of Nan shui-tao (South channel) are constantly changing, and the buoyage is moved accordingly.

Charts 1199, 2412, 1262, 2347, 1263.

Chart 1602.

The shore on the south-western side of Nan shui-tao, between Nan-hui tsui and the entrance to Huang-p'u chiang, is low, well wooded, cultivated, and partly embanked. Several beacons, for
 5 surveying purposes only, are erected at intervals of from 5 to 6½ miles along the shore; these are known as Nan-hui beacon (*Lat. 31° 05' N., Long. 121° 51' E.*), situated about 12 miles northward of Nan-hui tsui, Clump beacon, Chiu-tuan (Kiutoan) beacon, Chiu-tuan (Kiutoan) Small beacon, and Point beacon. The latter is situated about 3
 10 miles eastward of the entrance to Huang-p'u chiang and is a mast surmounted by a spherical daymark; the remainder are framework structures, each surmounted by a pole with a daymark. Nan-hui and Clump beacons are 90 and 70 feet (27^m4 and 21^m3) high, respectively. There is a dark cluster of trees near Clump beacon. The
 15 daymarks of the three northern beacons are spherical.

A conspicuous spire is situated about 5 miles south-westward of Chiu-tuan beacon.

The coast northward of Nan-hui tsui is fronted by a mudbank which dries out to a distance of nearly 7 miles east-north-eastward
 20 of the cape, and then gradually approaches the coast northward and disappears almost entirely near the entrance to Huang-p'u chiang. The southern part of this bank shelves gradually outside the drying edge, and is known as Shen (Sheng) t'an, but the northern part is fairly steep-to. The bank is of very soft mud, and on its outer parts
 25 there are generally large floating fishing stakes in long rows with nets attached to them.

The entrance to Nan shui-tao is divided into two parts by T'ung-sha sha-tsui (shoal), which lies about 17 miles north-eastward of Nan-hui tsui and has a least depth of 13 feet (4^m0) over it.

30 There are channels on either side of T'ung-sha sha-tsui, the northern being the deeper of the two. The southern edge of T'ung-sha ch'ien-t'an forms the northern side of the northern channel and in 1952 it was extending southward.

T'ung-sha shuan-sha (bar) is situated about 5 miles above T'ung-sha
 35 sha-tsui. Shen-t'an Middle beacon, consisting of an iron column painted in black and white horizontal bands and surmounted by a black ball, lies on the southern side of the channel about 14 miles northward of Nan-hui tsui. Chung sha (Middle ground), which partly dries, lies on the northern side of the channel northward of
 40 Shen-t'an Middle beacon. A beacon consisting of a grey iron column with a black frustum daymark, lies about 5½ miles north-north-eastward of Shen-t'an Middle beacon; it is only for use in connection with dredging operations, and is known as Chiu-tuan-sha beacon.

45 Heng sha, the south-easternmost of the islands lying on the north-eastern side of Nan shui-tao, is an alluvial island intersected by many creeks. A surveying beacon stands on the southern end of Heng sha. Yüan sha (Yuan-yuan sha), situated about 3 miles west-north-westward of Heng sha, is an island surrounded by a mud flat which
 50 dries.

Ya-wo sha, an island situated about 2 miles north-westward of Yüan sha, is surrounded by an embankment and is inhabited; an island, named Tung-hsing sha, lies close eastward of this island. A framework tower, about 50 feet (15^m2) in height, surmounted by a

Chart 1602.

pole with a spherical daymark, stands on the southern side of Ya-wo sha ; this beacon is for surveying purposes only.

A shoal, with a depth of 19 feet (5^m8) over it, was reported, in 1947 to lie on the northern side of the channel near the western end of Ya-wo sha. 5

P'an-chia sha (Yungting sha), Chung-pao sha and Shih-tou sha are islands lying on the drying flat extending about 6½ miles west-north-westward from Ya-wo sha. A framework tower, about 53 feet (16^m2) in height, surmounted by a pole with a cylindrical daymark, 10 stands on the eastern extremity of Shih-tou sha ; this beacon is for surveying purposes only.

Light.—A light is exhibited, at an elevation of 40 feet (12^m2), from a white mast on a dwelling, situated about 500 feet (152^m4) north-eastward of Chiu-tuan Small beacon (*Lat.* 31° 19' N., *Long.* 121° 39' E.). 15

Buoyage.—Fairway buoy, which is a light-and-bell-buoy, painted red and black in horizontal bands, exhibiting a *white flashing light every four seconds*, is moored about 5 miles south-south-westward of Niu-p'i chiao. 20

Nan-sha (South bank) can light-buoy, painted black and exhibiting a *white flashing light showing a short flash every four seconds*, is moored about 15½ miles east-south-eastward of Shen-t'an Middle beacon.

Entrance light-buoy, which is a black can light-buoy marked 'A' and exhibiting a *white group flashing light, showing two flashes every four seconds*, is moored about 12½ miles eastward of Shen-t'an Middle beacon. 25

T'ung-sha-ch'ien-t'an (Tungsha banks) light-buoy, marked 'B', painted black and exhibiting a *white group flashing light, showing two flashes every six seconds*, is moored about 9 miles eastward of 30 Shen-t'an Middle beacon.

Chiu-tuan-sha-tsui (Kiutoan spit) light-buoy marked 'C', painted black and exhibiting a *white group flashing light, showing two flashes every six seconds* is moored nearly 5 miles east-north-eastward of Shen-t'an Middle beacon. 35

Chiu-tuan (Kiutoan) can light-buoy, painted red and exhibiting a *white flashing light every four seconds*, is moored about 3 miles north-north-eastward of Shen-t'an Middle beacon.

Fooching light-buoy, No. 1 painted red and exhibiting a *white flashing light every four seconds*, is moored about 5 miles east-north-eastward of Clump beacon. 40

Chung-sha (Middle ground) light-buoy No. 2, painted red and exhibiting a *white flashing light every four seconds*, is moored about 6½ miles northward of Clump beacon.

Yüan-sha (South-east Knoll) light-buoy, No. 3, painted red and 45 exhibiting a *white flashing light every four seconds*, is moored about 1½ miles south-westward of the north-western end of Yüan sha.

Ya-wo-sha (Blockhouse) light-buoy, No. 4, painted red and exhibiting a *white flashing light every four seconds*, is moored about 4 miles north-north-westward of Chiu-toan Small beacon (*Lat.* 31° 19' N., *Long.* 121° 39' E.) 50

Quarantine light-buoy, No. 5, painted red and exhibiting a *white flashing light every four seconds*, is moored about 1½ miles east-north-eastward of the entrance to Huang-p'u chiang.

Charts 1199, 2412, 1262, 1263.

Chart 1602.

There are numerous wrecks in Nan shui-tao, and several are marked by light-buoys; for details, the chart should be consulted.

Anchorage.—**Quarantine anchorage.**—**Tidal stream.**—Vessels seeking shelter may anchor northward of a line joining Yüan-sha and Ya-wo-sha light-buoys. Vessels waiting to enter or leave Huang-p'u chiang may anchor northward of a line joining Ya-wo-sha and Quarantine light-buoys.

The Quarantine anchorage is situated northward of a line joining Quarantine light-buoy to the light-beacon on the extremity of the training wall at the northern side of the entrance to Huang-p'u chiang, and eastward of a line drawn 360° from a position half a mile eastward of the same light-beacon. Most of this anchorage is covered by the *green* sector of Wu-sung light (page 383) between the bearings of 199° and 242° .

North-westward of Quarantine light-buoy the flood stream attains a rate of $2\frac{1}{2}$ knots, and the ebb stream 4 knots.

Compass adjustment.—Three beacons, consisting of masts painted black and white in horizontal bands, each surmounted by a triangle, are erected on the western end of Chung-pao sha. The two front beacons are 45 feet (13^m7) in height, with the triangles point up; the rear beacon is 60 feet (18^m3) in height, with the triangle point down. The rear beacon in line with the southern front beacon bears $356^\circ 13'$, and in line with the western front beacon bears $086^\circ 21'$; the two front beacons are in line bearing $321^\circ 57'$.

Pei shui-tao.—**Beacons.**—She shan (Lat. $31^\circ 25' N.$, Long. $122^\circ 14' E.$), with its light, has been described on page 377.

Tung-wan sha or Drinkwater point, the south-eastern extremity of Ch'ung-ming tao, is low, covered with grass and reeds, and protected by embankments. A framework surveying beacon, 60 feet (18^m3) in height, surmounted by a pole and daymark, stands on Tung-wan sha; this beacon was reported, in 1949, to be destroyed.

Ch'i-hsiao ch'ien-t'an (Chiyao bank) is a drying bank which extends about $1\frac{1}{2}$ miles offshore close westward of Tung-wan sha.

A framework surveying beacon, 42 feet (12^m8) high, surmounted by a pole and topmark, lies about $7\frac{1}{2}$ miles west-north-westward of Tung-wan sha, near the entrance to Liu-hsiao chiang (Liuchiao kiang); it was reported, in 1949, to be destroyed.

Dumb surveying beacon, a tripod surmounted by a framework topmark, lies about 13 miles west-north-westward of Tung-wan sha, near the entrance to Tang-sha-tou chiang (kiang); near this beacon there is a jetty 400 feet (121^m9) long with a small beacon at its head.

Ch'ung-ming shui-tao, a crossing situated about 3 miles north-westward of Shih-tou sha, was formerly used by vessels proceeding from Pei shui-tao to the main channel of Ch'ang chiang.

As Pei shui-tao is changeable, and not adequately buoyed, no further description of it will be given.

Charts 1124, 1602.

Directions.—Owing to the constant changes taking place in the estuary of Ch'ang chiang, local knowledge is essential for entering the river, and directions will only be given to enable vessels to make Ch'ang-chiang-k'ou light-vessel.

From southward.—Full-powered steam vessels bound for Ch'ang chiang should steer for Hsiao-pan men (page 336), and pass through

Charts 1199, 2412, 1262, 1263.

Charts 1124, 1602.

it in about mid-channel, steering about 337° , so as to meet another vessel nearly end on. In thick weather, with the land obscured, it is advisable to anchor when some distance from Hsiao-pan tao by the reckoning, notwithstanding the fog signal there; good anchorage can be obtained in a depth of about 20 fathoms (36^m6), mud, but the tidal streams are very strong, and when anchoring the vessel should be brought head on.

From Hsiao-pan tao course should be shaped to pass about one mile eastward of Hsia-san-hsing (page 360), and thence proceed through Pai-chieh hsia (page 365); when past Pan-yang shan (page 364) a north-north-westerly course may be steered for Ch'ang-chiang-k'ou light-vessel, when the pilot should be taken on board, passing from 5 to 6 miles eastward of Ta-ch'i shan (page 362).

In thick weather, when Ta-ch'i shan (*Lat. $30^{\circ} 49' N.$, Long. $122^{\circ} 10' E.$*) cannot be seen from a reasonable distance, it is best to anchor, taking care to keep out of the fairway; it is then not safe to attempt to make Ch'ang chiang, as the tidal streams are rotatory and strong, and neither their rate nor direction can be relied on with accuracy. Vessels not exceeding 21 feet (6^m4) in draught can anchor southward of Ta-ch'i shan; those of greater draught can anchor northward of Elliot islands (page 367).

Charts 1429, 1199.

Steam vessels of low power may, during summer, follow the route just given for vessels of full power; during winter, when northerly winds prevail, they can use the inshore passage westward of Chou-shan ch'ün-tao (page 318). If their draught does not exceed 20 feet (6^m1) they can enter this passage through Niu-pi-shan shui-tao (page 296), and then take one of the three passes of Ch'i-t'ou yang (page 319); vessels exceeding this draught should pass outside Chiu-shan lieh-tao (page 299) and thence pass through Shih-p'eng chiang (page 309), which is the easiest to navigate of the various channels between the islands southward of Chou shan. The route for both light and deep draught vessels then leads past Roundabout island (page 321), through Pai-ya yang (page 323), Ts'e-tzu shui-tao (page 323), and Hsi-hou men (page 324); thence westward of Yü-hsing-nao (page 346), southward and eastward of Chi-chu lieh-tao (page 361), and thence steer for Ch'ang-chiang-k'ou light-vessel, passing eastward of Ta-ch'i shan.

Chart 1602.

From northward.—Steam vessels approaching Ch'ang chiang from northward or north-eastward make She shan (page 377) and Chiku chiao; if thick weather prevents either of these being seen from a reasonable distance, vessels should anchor outside. Care must be taken to avoid being set on to T'ung-sha ch'ien-t'an, which is hard.

Charts 389, 1601, 1602.

PORT OF SHANG-HAI.—**Port and Harbour limits.**—The Port of Shang-hai consists of two parts. The outer part is described as Ch'ang chiang, from its entrance to Pao-shan tsui, situated about $1\frac{1}{2}$ miles above the entrance to Huang-p'u chiang. The inner part, sometimes known as Shang-hai harbour, extends from the entrance to Huang-p'u chiang to Min-hang, a town situated about 24 miles from the entrance.

Charts 2809, 2412, 1262, 1263.

Charts 389, 1601, 1602.

The inner part is divided into ten sections, approximately as follows :—

Section 1. From the entrance to Huang-p'u chiang to Lao shui-tao (Old Ship channel), situated on the eastern side of the river about 3 miles from the entrance.

Section 2. From the upper limit of Section 1 to Kao-chiao chiang, situated on the eastern side of the river about 3 miles above Lao shui-tao.

Section 3. From the upper limit of Section 2 to Ping-ting road, which lies on the northern side of the river about 4 miles above Kao-chiao chiang.

Section 4. From the upper limit of Section 3 to Yang-shu-p'u (Yangtzepoo) chiang, situated on the northern side of the river about one mile above Ping-ting road.

Section 5. From the upper limit of Section 4 to a position nearly 2 miles above Yang-shu-p'u chiang.

Section 6. From the upper limit of Section 5 to the signal station at Lu-chia tsui (Pootung point), situated about half a mile further up stream on the eastern side of the river.

Section 7. From the upper limit of Section 6 to Chang-chia peng (pang), situated on the eastern side of the river about $1\frac{1}{2}$ miles above Lu-chia tsui (*Lat.* $31^{\circ} 14' N.$, *Long.* $121^{\circ} 30' E.$)

Section 8. From the upper limit of Section 7 to Lung-hua tsui, situated on the eastern side of the river about 3 miles above Chang-chia peng.

Section 9. From the upper limit of Section 8 to Man-li tsui, situated on the eastern side of the river about $2\frac{1}{4}$ miles above Lung-hua tsui.

Section 10. From the upper limit of Section 9 to the upper limit of the Port.

Chart 1601.

Huang-p'u chiang.—General remarks.—Depths.—Huang-p'u chiang (The Whangpoo) flows into Ch'ang-chiang estuary through a curved channel, inclining slightly downstream, situated west-south-westward of Chung-pao sha (page 379). It has a total length of about 60 miles, and its course is narrow and winding. It is a tidal river flowing through an alluvial plain, and its depths are liable to continual change. Long sections of its banks are protected by embankments from freshets. The bank on the starboard side of a vessel entering is often referred to as the Shang-hai side, and the opposite bank as the P'u-tung (Pootung) side. The river can be entered by any vessel whose draught permits of the passage through Nan shui-tao. A Conservancy Board is charged with the improvement and control of this river.

In 1948, when dredging operations were suspended indefinitely, several places in the channel had a minimum depth of from 24 to 25 feet (7^m3 to 7^m6). This necessitated vessels of more than 24 feet (7^m3) draught using two high waters to reach the open sea. Normally, when dredging is maintained, vessels can leave Shang-hai at low water, and reach the open sea on the following high water. The deep water channel from Wu-sung to Shang-hai was reported, in 1948, to be navigable at high water by vessels drawing up to 32 feet (9^m8).

Charts 2809, 1199, 2412, 1262, 1263.

Chart 1601, plan of Woosung bar.

Wu-sung k'ou.—**Beacons.**—**Cables.**—**Light-buoys.**—Wu-sung k'ou (Woosung bar), the entrance to Huang-p'ü chiang, lies between Lan-chiang-wai (Lan-kiang-wai) sha, a bank which extends about three-quarters of a mile from the southern side to a depth of 18 feet (5^m5), and Wu-sung (Woosung) spit, which extends about 6 cables eastward from the northern side and dries. Training walls, marked by beacons, are constructed on the drying flats on the south-eastern side of the entrance; the north-western side is formed by a training wall, which uncovers about 9 feet (2^m7) and is marked by beacons, extending along the southern edge of Wu-sung spit.

A number of submarine cables are landed on the southern side of the entrance within an area which is indicated on the chart. See page 37.

Both shores are low, cultivated, and intersected by numerous canals; they are protected by embankments from freshets. The Quarantine station is situated on the north-western side of the entrance.

Yün-tso peng (pang) is a creek entering the western side of the river about one mile west-south-westward of the inner end of the northern training wall; Wu-sung-chen (Woosung-chen) is situated on the northern side of the creek and contains some godowns and white-washed buildings. The railway from Shang-hai terminates near Wu-sung lighthouse (see below).

Lan-chiang-wai-sha (Lismore) light-buoy, situated about 3½ cables east-south-eastward of the eastern extremity of the northern training wall, is surmounted by a sphere, the whole painted black, and exhibits a white flashing light every four seconds. Fort light-buoy, situated about 3½ cables southward of Wu-sung lighthouse, is painted black, and exhibits a white flashing light every eight seconds.

Lights.—A light is exhibited, at an elevation of 26 feet (7^m9), from a black framework beacon on the eastern extremity of the northern training wall (*Lat. 31° 24' N., Long. 121° 31' E.*).

Wu-sung (Woosung) light is exhibited, at an elevation of 50 feet (15^m2), from a black square tower, 58 feet (17^m7) in height, situated near the inner end of the northern training wall. A light is exhibited, at an elevation of 30 feet (9^m1), from a white steel framework tower, with a white circular daymark, situated on the sea wall about three-quarters of a cable east-north-eastward of Wu-sung lighthouse. These two lights in line, bearing 250°, lead through the deep-water channel between the training walls.

Wu-sung light was reported, in 1948, to be extinguished.

Signal.—When the number of junks manœuvring in the channel at Wu-sung k'ou is such as to make navigation difficult, a large red flag will be displayed from a mast near the Quarantine station at Wu-sung-chen. A similar flag will be displayed from a mast on the Shang-hai side in Section 5 of the harbour (see page 382).

This signal is to be taken to mean that vessels intending to navigate the channel should proceed with extreme caution.

Wu-sung mao-ti.—**Storm signals.**—**Tidal streams.**—The lower limit of Wu-sung mao-ti is a line drawn 132° from Wu-sung lighthouse, and the upper limit is a line drawn 118° from a position on the western bank 8 cables above the lighthouse. Vessels at anchor here are liable to drag, and they are, therefore, advised to moor; a spare anchor should be ready to let go, as the water comes in rushes at

Chart 1601, plan of Woosung bar.

spring tides. Vessels intending to anchor should enter the river against the tidal stream.

Storm signals are exhibited from a signal station near Wu-sung lighthouse. See page 26.

At Wu-sung mao-ti the ebb stream begins from $1\frac{1}{2}$ to 2 hours after high water at spring tides, and from $1\frac{3}{4}$ to $2\frac{1}{4}$ hours after high water at neap tides; the flood stream begins from 20 to 40 minutes after low water at spring tides, and from one to $1\frac{1}{2}$ hours after low water at neap tides. The tidal streams make on both banks before they begin in mid-channel.

Tide indicator.—Tide signal.—A tide indicator, consisting of a vertical skeleton dial 30 feet (9^m1) in diameter, is erected on the tide-gauge station situated on the training wall about $3\frac{1}{2}$ cables north-eastward of Wu-sung lighthouse. The black numerals 0 to 18, each $3\frac{1}{4}$ feet (1^m1) in height, with black 3-foot (0^m9) radial lines beneath them, are set around 280° of the outer portion of the dial; the remaining sector of 80° at the base is blank. At the centre of the dial is a black pointer, $10\frac{1}{2}$ feet (3^m2) long, to indicate the height of the tide in feet above the chart datum; in the black space below the centre is a 7-foot (2^m1) black arrow head, which points upwards when the tide is rising and downwards when it is falling. At night, the numerals 0, 5, 10, 15, the pointer, and the arrow head are outlined by Neon lights; the remaining figures are indicated by spot lights. The dial faces the entrance to Huang-p'u chiang from seaward.

A black ball by day, or a *white* light at night, is exhibited during the rising tide from a mast, 15 feet (4^m6) in height, surmounting the tide indicator.

The tide indicator was demolished during recent hostilities, and repairs to it were still pending in 1948.

The river.—Buoyage and beacons.—Cables.—Mooring buoys.—Pei-chiang tsui is situated on the eastern side of Huang-p'u chiang and south-eastward of the entrance to Yün-tsao peng; a drying mud flat extends nearly $1\frac{1}{2}$ cables from the point. The Quarantine hospital and Decontamination station are situated here.

Yün-tsao-peng (Woosung Creek) light-buoy, situated about midway between the entrance to Yün-tsao peng and Pei-chiang tsui, is painted black, and exhibits a *white flashing* light every eight seconds.

About three-quarters of a mile south-south-eastward of Pei-chiang tsui is the north-western end of Kao-chiao sha; this island was formerly separated from the mainland by Lao shui-tao (Old Ship channel), which has now been closed by a training wall extending across the entrance and along the south-western side of the island to Kao-chiao chiang, situated about 3 miles south-eastward. The Harbour-master's office (*Lat. $31^\circ 21' N.$, Long. $121^\circ 30' E.$*), with a flagstaff, is situated on the western bank of the river, about one mile above the entrance to Yün-tsao peng.

Three submarine cables cross the river in the vicinity of the Harbour-master's office; see page 37.

Chart 1601.

Hsin shui-tao (Astrea channel) lies along the south-western side of Kao-chiao sha. Kao-chiao t'an (Astrea flats) extends for about $1\frac{1}{2}$ miles along the south-western side of the river opposite Kao-chiao chiang; training walls are constructed along this bank of the river.

Charts 1602, 2809, 1199, 2412, 1262, 1263.

Chart 1601.

No. 1 black can buoy is moored on the north-eastern side of Hsin shui-tao eastward of the Harbour-master's office. Nos. 2, 3, 4 and 5 light-buoys mark the south-western side of the channel in the vicinity of Kao-chiao t'an, and are each painted red and exhibit a *white flashing light every four seconds*; their positions can best be seen from the chart. 5

Several mooring buoys, for the use of Preventive and Conservancy vessels, are laid on the north-eastern side of the channel, within a distance of half a mile south-eastward of No. 1 black can buoy; these buoys are lighted at night when unoccupied. 10

A prominent water tower, in the form of a five-storied pagoda, lies on the southern side of the river about $1\frac{1}{2}$ miles above the Harbour-master's office.

A submarine power cable crosses the river about one mile southward of Kao-chiao chiang; the landing places of the cable are marked by notice boards inscribed "Cable crossing"; see page 37. 15

About $1\frac{1}{2}$ miles southward of Kao-chiao chiang, and on the western bank of the river, is the entrance to Chiu chiang, a narrow creek.

Chen-chia tsui is situated on the eastern side of the river, opposite Chiu chiang. A light-buoy, painted black and exhibiting a *red flashing light every eight seconds*, is moored off Chen-chia tsui. 20

A submarine cable crosses the river about $2\frac{1}{2}$ cables southward of Chen-chia tsui; the landing places are marked by notice boards. See page 37. 25

Chart 389.

Tung-kou t'an (flats) extends from the western bank of the river between the entrance to Chiu chiang and Chou-tsia tsui, also known as The Point, situated nearly 2 miles southward. These flats, which are sometimes known as Point island, are enclosed by training walls, marked by beacons, within which reclamation works are in progress. 30

Tung-kou is a creek on the eastern shore nearly one mile above Chen-chia tsui. The wharves of the Vacuum Oil Company and the Standard Oil Company of New York and the Cosmopolitan dock are situated on the P'u-tung side of the harbour from one mile to $1\frac{3}{4}$ miles above Tung-kou. Yang-ching chiang discharges into the P'u-tung side about $2\frac{3}{4}$ miles above Tung-kou. Lu-chia tsui, also known as P'u-tung point (*Lat. $31^{\circ} 14' N.$, Long. $121^{\circ} 30' E.$*), around which the river turns sharply, lies about $2\frac{1}{2}$ miles further upstream. A conical light-buoy, painted black, exhibiting a *red flashing light every four seconds* is moored off Lu-chia tsui, and marks the outer edge of the shoal, with depths of less than 3 fathoms (5^m5) over it, which extends nearly half way across the river from that point. Su-chou (Soo-chow) ho discharges into the Shang-hai side nearly opposite Lu-chia tsui. The Harbour office and Customs house are situated on The Bund on the Shang-hai side nearly half a mile above Su-chou ho. Chang-chia peng (pang) discharges into the P'u-tung side about $1\frac{3}{4}$ miles above Lu-chia tsui. Tungchiatu dock and wharves and Nanmatou wharf are on the P'u-tung side just above Chang-chia peng. Chiang-nan (Kiangnan) Arsenal is on the Shang-hai side about 2 miles above Chang-chia peng. 45 50

The width of the harbour varies from about $1\frac{1}{2}$ to $2\frac{1}{2}$ cables, and the depths from 20 to 60 feet (6^m1 to 18^m3). Both banks of the river within the limits of Shang-hai harbour are occupied almost entirely

Charts 1602, 2809, 1199, 2412, 1262, 1263.

Chart 389.

by wharves and other harbour structures. The harbour is crowded with all kinds of native craft, from large five-masted junks to sampans.

Lights.—A light is exhibited, at an elevation of 20 feet (6^m1), from a steel framework tower on a concrete dolphin, 20 feet (6^m1) in height, on the northern entrance point of Tung-kou (*Lat.* 31° 17' N., *Long.* 121° 34' E.).

A light is exhibited, at an elevation of 17 feet (5^m2), from a steel framework tower, 15 feet (4^m6) in height, on the northern end of I-t'ai-hsing (Nee-tai-shing) Coal Company's wharf, situated on the southern side of the entrance to Chang-chia peng.

Cables.—Submarine cables are laid across the harbour in several places. For their positions the chart should be consulted. The shore ends are marked by notice boards, which are illuminated at night.

See page 37.

Anchorage.—Vessels may anchor in Section 10; application for anchorage may be made to the Harbour-master. See page 382.

In Sections other than Section 10, vessels must not anchor without special permission from the Harbour-master.

Berths.—**Mooring buoys.**—**Depths.**—Almost all vessels in the harbour are berthed at wharves, but some lie in the stream. All berths in the stream within the sections are between head and stern mooring buoys.

There are about 130 mooring buoys in Shang-hai harbour; their positions and numbers can best be seen from the chart. There are an adequate number of mooring berths under Customs control available for overseas vessels.

A red fixed light is exhibited from the end buoy, when vacant, of each tier of mooring buoys; the remainder of the buoys, when vacant, exhibit a white fixed light.

The greatest depth alongside was 33 feet (10^m1), in 1940, and, at berths in the stream, 35 feet (10^m7) between Nos. 38 and 39 buoys.

Signals for swinging berths.—The special local signals described here are to be exhibited by vessels intending to swing at the berths at the mooring buoys in the stream, which are designated as "Swinging berths". These signals are to be exhibited at the masthead or where they are most clearly visible. In thick weather, when the visibility is bad, vessels should give an additional signal of five short blasts on their whistle.

Section 5: by day, the answering pendant above a black ball; at night, one red light below two white lights disposed vertically.

Section 6: by day, a black ball above the answering pendant; at night, two white lights, disposed vertically, below one red light.

All other sections: by day, a black ball; at night, a red light above a white light.

The above signals are to be exhibited by vessels when proceeding to and swinging in the berths, and are to remain hoisted until the swinging manœuvre is completed.

During daylight, if the swinging berths in Sections 5 and 6 are occupied by a vessel carrying out the swinging manœuvre, the signal station of the Custom's depot at Lu-chia tsui will hoist the same signal as that required for the vessel swinging.

When a signal indicates that a swinging berth is occupied by a vessel

Chart 389.

swinging, then all other vessels shall keep clear of that berth until the signal has been hauled down.

Dredger signals.—A red flag over a black triangle, or three *red* lights arranged triangularly, signifies a dredger operating in the centre of the river. 5

A red flag over a black ball or three lights arranged triangularly, apex *white* and base *red*, signifies a dredger operating on the P'u-ting side of the centre of the river.

A red flag over two black balls, or three lights arranged triangularly, apex *red* and base *white*, signifies a dredger operating on the Shang-hai side of the centre of the river. 10

A red flag over a black rectangle, or three *white* lights arranged triangularly, signifies a pump vessel operating alongside the river bank. 15

Signals for Salvage vessels.—The following signals are to be used by Salvage vessels :—

By day.—One square green flag. While the vessel is working, the International Signal Code flags TE are also to be hoisted. When a diver is working below the surface, one square red flag is hoisted in 20 addition.

By night.—Two lights, *green* over *white*, visible all round, while the vessel is working, or when a diver is working below the surface, two *green* lights, vertically disposed and visible all round. 25

Charts 389, 1601.

Prohibited anchorage.—Anchorage is prohibited in an area in the upper reach of the port, shown by pecked lines on the chart, which includes the whole of Section 9, and parts of Sections 8 and 10.

Harbour regulations for the Port of Shang-hai.—The following are extracts from the Harbour regulations for the Port of Shang-hai, 30 published on 3rd January, 1953.

7.—Foreign vessels entering or leaving the port must send in their application for permission to the Harbour-master 48 hours before arrival and 24 hours before departure.

8.—Vessels loading or discharging cargo must send in their 35 application for approval to the Harbour-master 24 hours beforehand.

12.—Any foreign vessel coming within T'ung-sha shuan-sha (*Lat. 31° 06' N., Long. 122° 01' E.*) for shelter from the weather must first apply to the Harbour-master for permission.

13.—On entering or leaving harbour, all vessels must hoist flags as 40 follows :—

Chinese vessels.—Chinese National flag, Company flag, Registered Steamer flag.

Foreign vessels.—National flag, Company flag, and Registered Steamer flag. Also Chinese National flag at the foremast. 45

When arriving, the above flags should be hoisted half an hour before entering harbour.

14.—Any vessel in quarantine must hoist Q flag of the International Code of Signals on entering the harbour limit, and anchor in the quarantine anchorage to await inspection. When a permit has been 50 obtained from the Quarantine officer, either for free or restricted movement, the vessel may proceed to enter the harbour subject to the following regulations :—

(a) A vessel coming from an infected port should hoist Q flag

Charts 1602, 2809, 1199, 2412, 1262, 1263.

Charts 389, 1601.

by day, or three *red* lights vertically disposed by night, if the crew, passengers, and live-stock on board are in normal healthy condition.

- 5 (b) If the crew, passengers, or live-stock are suspected of being infected, two Q flags by day or four lights, *red, red, white, red*, vertically disposed, by night, must be hoisted on entering the harbour limit.
- 10 (c) If death has occurred among the crew, passengers, or live-stock during the voyage, or if there is a corpse on board, Q and L flags must be hoisted by day, or four lights, *red, white, red, white*, vertically disposed, by night.

With reference to (b) and (c), the condition must be reported to the Harbour-master by radio before arriving off T'ung-sha
15 shuan-sha. (*Lat. 31° 06' N., Long. 122° 01' E.*).

18.—When a vessel is in port, the use of the following equipment and apparatus is prohibited :—

Chinese vessels.—Radio transmitter and receiver.

Foreign vessels.—Radio transmitter and receiver, sounding
20 apparatus, radar direction finder, self-defence weapons, signal gun, cameras, and telescopes.

20.—The Harbour-master is empowered to stop any vessel while navigating in the harbour if circumstances require him to do so.

21.—While navigating in the harbour the speed of vessels must
25 be regulated so that no damage is done to wharves, banks, any kind of erections, or other vessels. Speed should be reduced to the minimum when other vessels in the vicinity are going alongside, discharging or loading dangerous cargoes, salvaging, or dredging.

22.—Vessels are prohibited from anchoring within 100 metres of
30 submarine cables or pipe-lines.

54.—Marks for sunken vessels or other underwater obstructions are as follows :—

By day.—Green buoy or green square flag.

By night.—*Green* lights, or two lights, *green over white*.

35 69.—No refuse is to be thrown into the river. Vessels wishing to discharge ashes or other refuse should signal for the Ash boat ; see page 389.

74.—Application for entering or leaving harbour, as well as for conveyance of all dangerous cargoes enumerated in the list under
40 the " Temporary Regulations Governing Dangerous Cargo ", such as explosives, inflammables, self-combustibles, combustibles, oxygenic mixtures, toxics and corrosives, either in solid or liquid form or gaseous substances likely to cause fire or explosion to buildings, vessels, or cargo in the harbour, or to involve risk of life or injury
45 to man or beast, should be made to the Harbour-master 24 hours beforehand. Loading, discharging, and conveyance of dangerous cargo can only be done under the Harbour-master's permit. Applications should include the following details :—

- (a) Time of arrival of the dangerous cargo.
- 50 (b) Description, quality, and quantity of the dangerous cargo.
- (c) Packing and storage.
- (d) Means of conveyance on its arrival.
- (e) Destination and name of consignee.

Charts 1602, 2809, 1199, 2412, 1262, 1263.

Charts 389, 1601.

81.—Incoming vessels with inflammable cargo on board should anchor at a berth appointed by the Harbour-master and discharge her goods under the latter's supervision. Outgoing vessels should sail directly from the place where the dangerous cargo has been loaded. 5
In the case of oils in bulk, the vessel should discharge into authorised tanks where fire equipment is ready. Transit steamers carrying dangerous cargo should act according to the Harbour-master's instructions in this respect.

117.—No crew or passenger of foreign nationality is allowed to go 10
ashore without permission.

122.—Photographing, surveying, and sketching of the harbour is not allowed without permission.

128.—Oils and oily substances must not be thrown into the river. Oil tanks and bilges must not be cleaned in the harbour, or within 15
15 miles of Wu-sung k'ou.

Quarantine regulations.—For the Quarantine regulations for Shang-hai and other ports in China, *see* page 36.

Port signals.—The following signals, by flags of the International Code of Signals, together with, in certain cases, equivalent night and 20
sound signals, were in use in the port of Shang-hai in 1953 :—

<i>Signal</i>	<i>Meaning.</i>	
Flag B . . .	Dangerous or inflammable cargo on board. At night, a <i>red</i> light is to be hoisted.	25
Flag D . . .	Vessels entering or leaving a dockyard. At night, three lights, <i>white, red, red</i> , vertically disposed, are to be hoisted.	
Flag G . . .	Pilot required.	
Flag H . . .	Pilot on board.	30
Flag I . . .	Fumigation officer required.	
Flag L . . .	Custom's officer required.	
Flag N . . .	Harbour officers required.	
Flag P . . .	To sail soon.	
Flag U . . .	Tug required.	35
Flag R . . .	Water boat required.	
Flag W . . .	Medical officer required. In case of emergency a black ball should be hoisted under the flag. At night, three lights, <i>white, red, white</i> , vertically dis- 40 posed, should be hoisted, and <i>one short</i> and <i>two long</i> blasts on the siren or whistle should be sounded.	
Flag X . . .	Stevedores required.	
Flag Y . . .	Mails on board.	45
Second substitute .	Ship's surveyors required.	
Flags DV . . .	Leakage on board, pumping boat required. At night, three lights, <i>red, green, green</i> , vertically disposed, should be hoisted.	50
Flags DW . . .	Mooring sampan required. <i>Two long</i> blasts on the siren or whistle may also be used.	
Flags FS . . .	Ash boat required.	

Charts 1602, 2809, 1199, 2412, 1262, 1263.

Charts 389, 1601.

- Flags NQ . . . Fire tender required. At night, *three* lights, *green, white, red*, vertically disposed, should be hoisted; also continuous whistling.
- 5 Flags ST . . . Police officers required. At night, three lights, *red, white, red*, vertically disposed, should be hoisted.
- 10 Flags HG . . . Pilot ferry-boat required.
- Flags TE . . . Vessels passing are requested to reduce speed.
- Flag F below answering pendant. Ferry-boat required by vessel lying outside Wu-sung k'ou. At night, two *red* lights, horizontally disposed.
- 15

For signals in connection with quarantine, *see* paragraph 14 of the Harbour regulations.

- Tidal streams.**—At Shang-hai the flood stream runs from about $2\frac{3}{4}$ hours after low water until about $3\frac{1}{2}$ hours after high water at Wu-sung k'ou; the ebb stream for the remainder of the tidal period. Both streams attain a rate of from 3 to 4 knots at springs. After rains the ebb may commence about 3 hours after high water and continue until $3\frac{1}{2}$ hours after low water at Wu-sung k'ou. Under normal weather conditions there is practically no slack period between the
- 20
- 25 end of the ebb and the commencement of the flood at spring tides.

Directions.—Except with local knowledge, vessels should not enter Huang-p'u chiang without a pilot; the tide indicator at Wu-sung (page 384) should be consulted so as to obtain the depths at the time in the entrance and in Hsin shui-tao.

- 30 Shang-hai pilots find that the handling of deep draught ships is facilitated by taking them up with the flood stream, turning and berthing them bows down. At the top of spring tides, however, it is prudent to time entry to avoid turning on the full strength of the flood stream. As soon as high water has made, the strength of the
- 35 stream decreases and turning can be effected with safety. The s.s. *Laurentic*, with an overall length of about 700 feet (213^m4), is reported to have turned in the harbour. The most frequently used turning places are in Section 5 and in Section 6 off the entrance to Su-chou ho. There is a turning place in Section 7 and one for
- 40 large vessels in Section 8.

- The leading lights at Wu-sung, in line bearing 250° , leads between the training walls and northward of Lan-chiang-wai-sha light-buoy. Thence a vessel should hold the western bank of the river at a distance of about two-thirds of a cable until abreast the Harbour-master's
- 45 office, situated about one mile above Yun-tsao peng, passing westward of Fort and Yün-tsao-peng light buoys; the fairway through Wu-sung mao-ti (page 383) is eastward of the vessels moored there, and it is not advisable to enter whilst they are swung across the channel.

- In proceeding up Hsin shui-tao, from abreast the Harbour-master's
- 50 office (*Lat. $31^\circ 21' N.$, Long. $121^\circ 30' E.$*) vessels should steer to pass nearly one cable southward of No. 1 black can buoy, then a cable northward of No. 2 light-buoy, nearly the same distance northward of No. 3 light-buoy, and about three-quarters of a cable eastward of Nos. 4 and 5 light-buoys.

Charts 1602, 2809, 1199, 2412, 1262, 1263.

Charts 389, 1601.

Between Hsin shui-tao and No. 11 mooring buoy (in Section 5, nearly $1\frac{1}{2}$ miles below Lu-chia tsui) the greatest depths are near the eastern and southern sides of the river; in Section 5, however, vessels must cross to the northern side of the river between Nos. 10 and 11 mooring buoys, and continue along this side so as to pass northward of Nos. 1 to 10 mooring buoys in Section 5. 5

Great attention to the helm is necessary when rounding Lu-chia tsui. It would be extremely dangerous to take this bend with the tidal stream, especially at spring tides. 10

When leaving the port, it is most desirable for large deep draught vessels to sail when the first of the flood stream makes, even if this should involve anchoring outside Wu-sung to await the next flood tide to cross Tung-sha shuan-sha. With expert local knowledge, it is possible to leave berths below Su-chou ho on the last hour of the ebb, and make the passage across Tung-sha shuan-sha on one tide. 15

Chart 389.

Shang-hai.—Shang-hai is the most important centre of foreign trade in China; as it is the nearest seaport to the great city of Wu-hsien (Soochow), situated on Yün ho (The Canal Imperial) about 37 miles west-north-westward, it has always been a considerable place of trade, but after it was opened to foreign commerce in 1842 it gradually rose from a third-class city to one of the chief commercial emporia in the world. The name signifies "upon the sea", and although it is now 10 miles from the coast, Chinese annals state that it was once on the seashore, and that the low land which now intervenes has been formed by alluvial deposits. For 50 miles around the city there is water communication with the interior in every direction by the numerous canals and creeks which intersect the province. 20 30

The native city, which is surrounded by walls, is situated on the western bank a short distance above the bend in the river at Lu-chia tsui. The area formerly known as the French settlement lies westward and northward of the native city, and also extends along the river as far as the creek which leads to the East gate; the noteworthy buildings in this settlement are the Consulate, the Town hall, and the Roman Catholic cathedral. The area formerly known as the British settlement lies between the above area and Su-chou ho, a creek spanned by several bridges; the British Consulate, a large square building with a long façade, stands near the southern bank of this creek. 35 40

All along The Bund are many fine buildings and some public gardens; in the middle of the bund are the Chinese Maritime Customs house, which is surmounted by a high clock tower, and the Harbour-master's office. The area formerly known as the International settlement extends about one mile up the northern bank of Su-chou ho and along the river side north-eastward; it contains the other foreign Consulates and the offices of many of the leading mercantile firms. On the P'u-tung side of the river are the wharves and warehouses of various shipping companies, engineering and shipbuilding works, and industrial buildings; the dépôt of the Chinese Maritime Customs and a signal station are situated on Lu-chia tsui (*Lat. 31° 14' N., Long. 121° 29' E.*). 45 50

In 1952, there was a total population of 5,407,000.

Charts 1602, 2809, 1199, 2412, 1262, 1263.

Chart 389.

Harbour facilities.—Supplies.—Communications.—There are several dry docks in Shang-hai. The largest is at Chiang-nan Arsenal ; for its dimensions *see* Appendix I, page 706.

- 6 Repairs of all kinds can be executed, and there are sheers and cranes capable of lifting up to 80 tons.

There are several hospitals.

- In 1948, there were restrictions on the supply of coal and oil fuel, and supplies were only available on application to the Chinese
10 Government Fuel Control Commission.

Fresh provisions are plentiful ; water can be taken in alongside or in the stream from water boats.

- There is rail communication with Wu-sung, Hang-chou, Nan-ching, and North China generally. There is steamer communication with
15 all parts of the world. Shang-hai has world-wide telegraphic and cable facilities, and trans-oceanic telephone facilities.

Air mail and passenger facilities are adequate.

Deratisation.—*See* page 37.

- Time signals.**—Day time signals are made from the semaphore near
20 the French Consulate.

Storm signals.—Typhoon signals are displayed from time to time at the observatory situated near the French Consulate (*Lat.* 31° 14' N., *Long.* 121° 29' E.) in Section 7 on the Shang-hai side.

- On the approach of a gale, signals will also be given at the Naval
25 Signal station at Wu-sung, the Signal station on the P'u-tung side opposite the entrance to Yang-shu-p'u chiang in Section 4, the Custom's Clock tower at Lu-chia tsui and the Water tower at P'ing-an dock on the P'u-tung side in Section 8.

- The signals used are those specified in the regulations published
30 by the Meteorological Bureau of the Revolutionary Military Committee of the Central People's Government.

- Barometer signals.**—At 1600, signals were formerly made by the numeral pendants of the International Code of Signals from the Storm signal station, near the French Consulate indicating the height
35 of the barometer at Hsü-chia-hui (Zikawei) observatory reduced to 32° Fahr. and to sea level. Only three pendants were used at each hoist, the initial figure being omitted, thus :—024—30·24 ; 994—29·94 ; 879—28·79. This afforded a means of comparing barometers with a standard. These signals may still be in use.

- 40 **Health.**—There is cholera in the native city every summer, and partial outbreaks have occurred at intervals in recent years in the foreign settlements, but the majority of the foreigners' cases were among the merchant ships in the harbour.

- Malarial fevers exist ; dysentery and diarrhœa are prevalent, and
45 are apt to become chronic during spring and autumn on account of the sudden changes of temperature, with an atmosphere usually laden with moisture.

- Seamen visiting the port should wear flannel belts round the belly and avoid chills ; they should eschew the use of unripe or over-ripe
50 fruit, native-made aerated waters, and ice, except machine-made from good water.

Smallpox may be considered endemic amongst the Chinese during autumn and winter, and visitors should be re-vaccinated, if that operation has not been recently performed. Sunstroke is frequent

Chart 389.

during the very hot weather, which generally begins in the second week of July and ends in the second week of September ; during this period no man should be allowed to go out in the sun who is suffering from even mild fever, or who has consumed much intoxicating liquor. 5

Enteric fever is common in autumn. Venereal diseases are very prevalent.

Generally, a healthy, temperate European or American, who adopts ordinary and proper precautions, has nothing to fear from the climate of Shang-hai. 10

Climatic Table.—*See* Chapter I, page 71.

Consul.—There is a British Consul-General at Shang-hai.

Chart 2412.

Huang-p'u chiang above Shang-hai.—In 1862, Huang-p'u chiang was ascended for about 27 miles above Shang-hai by a vessel with a draught of 20 feet (6^m1), which moored in a depth of 16 fathoms (29^m3) off the entrance to a creek leading to the city of Sung-chiang (Sungkiang). 15

Chart 3522.

CH'ANG CHIANG.—Ch'ang chiang, over 3,000 miles long and traversing six provinces, is one of the four largest rivers in the world ; it is the great artery of China, constituting one of the chief elements in the developments of her commerce. The river from the sea to Han-k'ou (Hankau) is known as the Lower Ch'ang ; between Han-k'ou and I-ch'ang, the Middle Ch'ang ; and above I-ch'ang, the Upper Ch'ang. 20 25

For information concerning this river, *see* Yangtze kiang Pilot, and the Chinese Maritime Customs publication " Handbook for the Guidance of Shipmasters on the Ichang-Chungking section of the Yangtze river." 30

Charts 1601, 1602, 2809, 1199, 1262, 1263.

CHAPTER VIII.

EASTERN SEA AND YELLOW SEA.—THE COAST OF CHINA FROM
CH'ANG CHIANG TO YEN-T'AI.

Charts 3480, 2412.

EASTERN SEA AND YELLOW SEA.—General remarks.—Eastern sea or Tung hai lies between the eastern coast of China and the chain of islands between Formosa and Japan ; it extends northward from 5 Formosa to a line joining the mouth of Ch'ang chiang or Yangtze kiang and the south-western extremity of Korea. The climate in this area is temperate. Gales are of common occurrence, with occasional typhoons, and snowstorms in winter ; the summer is fine. The currents, beyond the influence of Ch'ang chiang and the coastal 10 tidal streams, seem to be irregular, except in the eastern part, through which Kuro shio or Japan stream sets north-eastward and northward.

Yellow sea or Huang hai lies northward of Eastern sea, and between the coast of China from Ch'ang chiang to Shan-tung kao-chiao (promontory) and the coast of Korea.

15 *Chart 3480.*

Banks and rocks.—Great Yangtze (Yang-tse) bank, with general depths of less than 20 fathoms (36^m6), extends from the estuary of Ch'ang chiang to a position about 125 miles east-north-eastward of She shan.

20 Socotra rock (*Lat. 32° 07' N., Long. 125° 11' E.*), situated about 154 miles east-north-eastward of She shan, is a small coral patch over volcanic rock, with a depth of not more than 3 fathoms (5^m5) over it. There are depths of from 27 to 30 fathoms (49^m4 to 54^m9) within a quarter of a mile of the rock, except on the south-western side, where 25 a rocky ledge, with a least depth of 17 fathoms (31^m1), extends half a mile. The tidal streams set strongly over the rock, and there are overfalls and tide-rips, whilst the sea sometimes breaks over it ; with a favourable light the greenish colour of the water may be seen, but only from a short distance.

30 A depth of 11 fathoms (20^m1) was obtained by the s.s. *Le Bruix*, in 1907, about 24 miles southward of Socotra rock, and a depth of 17 fathoms (31^m1) by H.M.S. *Alacrity*, in 1902, about 26 miles east-south-eastward of this rock.

A bank, with a depth of 11 fathoms (20^m1) over it, is situated 35 in approximate *Lat. 35° 38' N., Long. 122° 44' E.*

COAST.—Ch'ang chiang to Chiao-chou wan.—General remarks.—The coast between the entrance to Ch'ang chiang and Chiao-chou

Charts 1262, 2347, 1263.

Chart 3480.

wan (Kiaochow bay), situated about 280 miles north-north-westward, trends generally north-westward and is flat and featureless for about 230 miles, and then turns gradually to north-eastward and is backed by hills which rise to an elevation of over 2,000 feet (609^m6) in places. 5

Lao-yao harbour, the only port of any importance, lies nearly 90 miles south-westward of Chiao-chou wan.

Coast.—Off-lying banks and dangers.—Islands.—Beacon.—Buoys.—The coast of China from the northern entrance of Ch'ang chiang to Hung-shih tsui, situated about 225 miles north-westward, 10 is low and is intersected by numerous streams. The southern half of this coast is fronted by extensive flats and shoals, some of which extend about 50 miles from the coast; this area has not been surveyed, and it must, therefore, be avoided. Among these banks are Wunan sha, Lang-chia (Lan-kia) sha, Chin-chia (Chin-kia) sha, 15 Huang-tzu (Hwan-tsi) sha, and Pei (Pih) sha.

In 1922 a Japanese steamer struck a shoal of hard mud, with a depth of less than 6 feet (1^m8) over it, about 59 miles northward of She shan and afterwards sank; this shoal is marked "P.A." on the charts. Vessels are warned to exercise caution when navigating 20 in this locality, as reports indicate the probable existence of further shoals.

Vessels with a draught not exceeding 24 feet (7^m3) can take a direct route from a position in Lat. 32° 00' N., Long. 122° 30' E. to T'a-lien (Chaolien) tao (page 400), a distance of about 248 miles north-north- 25 westward, taking care that they are not set westward of this track.

A beacon, 100 feet (30^m5) high, is reported to stand on the coast approximately 130 miles north-north-westward of the entrance to Ch'ang chiang.

Considerable numbers of buoys are moored off the northern half 30 of this stretch of coast. The outermost buoy is about 35 miles offshore in Lat. 33° 58' N.; for the positions of the remainder the chart should be consulted.

K'ai shan, an island 126 feet (38^m4) high, lies about 2½ miles off the mouth of Kuan ho, which flows out about 22 miles east-south- 35 eastward of Hung-shih tsui; this river is navigable for small vessels up to Hsiang-shui-k'ou, about 22 miles south-westward of the entrance.

Lo-tzu ho flows out about 9 miles north-westward of the entrance to Kuan ho, and is navigable for small vessels up to a distance of 40 about 4 miles within its entrance.

Shih-lung t'ou is situated about 1½ miles southward of Hung-shih tsui, and close southward of it lies Kao-kung tao, an islet about 200 feet (61^m0) high.

Tidal streams.—The tidal streams off the banks northward of the entrance to Ch'ang chiang, and eastward to about the meridian 45 of 124° E., are rotatory, and their directions and rates are shown by tidal arrows on chart 3480; the tidal streams are, however, considerably influenced by the prevailing winds, and a rate of 4½ knots has been observed at spring tides after a long period of strong north-easterly winds.

Coast.—Islands.—From Hung-shih tsui (Lat. 34° 44' N., Long. 119° 28' E.), the coast trends about 6 miles west-north-westward to Pei-yang tsui; Lao-yao harbour, which is described below, lies about 1½ miles west-north-westward of Hung-shih tsui.

Charts 2412, 1262, 1263.

Chart 3480.

Tung-lien tao, a bare rocky island, with a prominent sharp summit, 1,179 feet (359^m₄) high, lies off the coast northward of Hung-shih tsui, separated from the mainland by a strait with a least width of 5 about one mile. There are two islets, 75 and 22 feet (22^m₉ and 6^m₇) high, respectively, close westward of the north-western point of Tung-lien tao, and some drying reefs about 3 cables northward of the same point.

Lien-yün is a walled town on the coast about 1½ miles southward 10 of Pei-yang tsui. Ling tao, 69 feet (21^m₀) high, lies about half a mile south-eastward of Pei-yang tsui, and Chu tao, 185 feet (56^m₄) high, lies about a quarter of a mile offshore about 1½ miles westward of the same point. Pei-ku shan, 800 feet (243^m₈) high, is situated about one mile west-south-westward of Pei-yang tsui.

15 Hills rise abruptly to a height of about 2,000 feet (609^m₆) within about one mile of the shore on this stretch of coast; the higher peaks are frequently obscured by clouds.

Light.—A light is exhibited, at an elevation of 396 feet (120^m₇), near the eastern extremity of Tung-lien tao.

20 **Lao-yao harbour.—Breakwaters.—Wharves and piers.—Depths.—Anchorage.**—Lao-yao is the only harbour between Shang-hai and Chiao-chou (Kiaochow) wan which is available for medium size vessels. It is the eastern terminus of Lung-tai railway, which passes through Tung-hai (page 398) and gives access to all parts of North 25 China.

The harbour is constructed artificially. The two main wharves, each about 2½ cables long, are 1½ cables apart and parallel to each other; they extend at about right angles to the shore, and the eastern wharf is about 1½ miles from Hung-shih tsui (*Lat. 34° 44' N., 30 Long. 119° 28' E.*). The eastern wharf is prolonged for about 3½ cables by a breakwater. Between these two wharves there are three piers for the use of small craft. A curved breakwater was under construction in 1946; its root lies about half a mile westward of the western wharf, and its outer end is planned to be about 1½ cables 35 northward of the outer end of the breakwater extending from the eastern wharf. It is reported that this breakwater, on completion, will enclose an anchorage large enough to accommodate from 15 to 20 vessels of about 3,000 tons, in depths of from 24 to 26 feet (7^m₃ to 7^m₉).

40 A prominent white tower stands at the root of the eastern wharf, and close eastward of this tower is a signal station, from which the entry and departure of vessels is controlled.

The harbour can only be approached from eastward. A channel, with a depth of 20 feet (6^m₁), in 1935, was dredged close along the 45 southern side of Tung-lien tao, with its centre line marked by leading beacons, in line bearing 263°. The depths in this channel were reported to be liable to change. There is reason to believe that a new channel has been established southward of the original channel, but no certain information is available. A report, in 1945, 50 gave 16 feet (4^m₉) as the maximum draught which can be carried into the harbour at high water. Entrance should not be attempted without local knowledge.

Light.—A light is exhibited, at an elevation of 21 feet (6^m₄), from an iron column on a hut on the breakwater extending from the

Chart 3480.

eastern wharf at Lao-yao harbour. It was reported, in 1944, to be extinguished.

Harbour facilities.—In 1948 it was reported that there were depths of from 8 to 12 feet (2^m4 to 3^m7) alongside the wharves, but, owing to the soft nature of the bottom, vessels drawing up to 18 feet (5^m5) are berthed alongside. In 1946, there were two floating cranes, of 5 and 20 tons capacity, available, and two small tugs and two lighters, each of 100 tons capacity, were available. Fresh water is laid on to the wharves.

Pilotage.—In 1948 there were two pilots available. Pilots board ships off Tung-lien tao.

Hai-chou wan.—**Islet.**—**Anchorage.**—Hai-chou (Haichow) wan is entered between Chu tao (*Lat. $34^{\circ} 47' N.$, Long. $119^{\circ} 20' E.$*) and Lan-shan t'ou (Observation point), situated about 20 miles northward; the bay is shallow and has a gently sloping bottom of soft mud. The bay is exposed, but is reported to be suitable for anchoring in calm weather; reports on the quality of the holding ground are conflicting.

There are a number of fishing stakes from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles northward of Chu tao. It is reported that the bay is encumbered with fishing nets, of which the floats may be visible only at slack water.

Ch'in shan, an islet 182 feet (55^m5) high, lies near the middle of the bay about $6\frac{1}{2}$ miles north-westward of Chu tao. A drying stone causeway extends about $1\frac{1}{2}$ miles west-south-westward from this islet, which lies about 2 miles inside the 3-fathom (5^m5) line. There is a landing place on a small sandy beach on the south-eastern side of Ch'in shan.

There is reported to be good anchorage, in a depth of 2 fathoms (3^m7), about $1\frac{1}{2}$ miles south-eastward of Ch'in shan, with its summit bearing 310° . Small craft can find shelter from northerly winds southward of Ch'in shan and the causeway.

Hai ho, which is described below, flows out in the south-western corner of the bay.

The village of Hsia-k'ou, said to be available to junks drawing 9 feet (2^m7), lies near the entrance to a creek situated about 6 miles west-south-westward of Ch'in shan; about 3 miles further up this creek is the small walled city of Ch'ing-k'ou.

A river flows into the bay about $4\frac{1}{2}$ miles west-north-westward of Ch'in shan; the entrance is marked by breakers at high water. Junks drawing from 6 to 8 feet (1^m8 to 2^m4) can enter at high water and reach the town of Ch'u-men-k'ou, near the entrance.

Ta-wu shan (*Lat. $35^{\circ} 00' N.$, Long. $118^{\circ} 58' E.$*), 1,060 feet (323^m1) high, lies about 13 miles inland, west-north-westward of Ch'u-men-k'ou.

Frost and slight falls of snow are experienced in the vicinity of Hai-chou wan in the winter, but the rivers do not usually freeze; the months of July and August are very hot and oppressive.

Hai ho.—Hai ho is navigable by small vessels as far as Ta-p'u, situated about 7 miles within the entrance. Only river craft and junks can navigate above Ta-p'u.

There are salt pans on both sides of the entrance. The shallowest part of the approach channel lies from $1\frac{1}{2}$ to 3 miles north-north-eastward of the entrance; here the depths were from one to 3 feet

Chart 3480.

(0^m3 to 0^m9) in 1937. Entrance is possible only at high water, and local knowledge is essential. A vessel of 1,600 tons, with a draught of 15 feet (4^m6) reached Ta-p'u in 1926.

- 5 There are wharves at Ta-p'u which had a depth of 5 feet (1^m5) alongside in 1937. Vessels can safely rest on the soft mud bottom. Vessels are turned before berthing at Ta-p'u, the turn being made at a point just above the wharves.

Ta-p'u is connected to Lung-hai railway by a branch line.

- 10 Tung-hai, a walled city, is situated on Hai ho about 4 miles south-westward of Ta-p'u, and stands on an alluvial plain at the foot of a short, irregular range of hills, the highest peak of which is about 1,500 feet (457^m2) high.

- Tidal bore.**—There is a tidal bore in Hai ho, which occurs about 15 one hour after low water. The bore is reported to be about 4 feet (1^m2) high and travels up the river, beyond Ta-p'u, at a speed of about 6 knots; the height is probably that at springs.

- Directions.**—A vessel should leave the anchorage south-eastward of Ch'in shan just before some white rocks off the western end of 20 this island are covered by the rising tide. By proceeding to the river mouth at a speed of about 10 knots, a vessel will avoid both the tidal bore and the extreme flood current, but will have a favourable river current behind her. The point above Ta-p'u where a vessel must be turned round will be reached at about the right time, i.e.: 25 when the tide is still rising, but the strength of the current is slight.

- Off-lying islets.**—**Light.**—Ch'e-niu shan, situated about 22 miles north-eastward of Tung-lien tao, is the northernmost of a group of five islets and rocks. A light is exhibited, at an elevation of 241 feet 30 (73^m5), from an iron framework structure, 22 feet (6^m7) in height, situated on the summit of Ch'e-niu shan (*Lat.* 34° 58' N., *Long.* 119° 53' E.).

- Ta shan, an islet 169 feet (51^m5) high with a rugged top and steep sides, lies about 4 miles east-north-eastward of Ch'e-niu shan; 35 situated near the south-eastern side of this islet is a small rocky islet. P'ing tao, 149 feet (45^m4) high, lies about 7 miles northward of Ta shan; a reef, with rocks above water on it, extends about half a cable from the western extremity of P'ing tao, and a small islet, with a reef extending eastward from it, lies about one cable off the 40 eastern extremity.

The above islets are frequently enveloped in fog during spring and early summer.

- Coast.**—**Islands and dangers.**—**Anchorage.**—Lan-t'ou (Fengtou) shan, a hill 1,058 feet (322^m5) high, is situated about 2½ miles north- 45 ward of Lan-shan t'ou (page 397); thence to Shih-chiu tsui, about 21 miles north-north-eastward of Lan-shan t'ou, the land is low and undulating. In the bight between Lan-shan t'ou and Kuei-shan tsui, a point lying about 17 miles north-north-eastward, the 5-fathom (9^m1) line extends to nearly 5 miles offshore in places, and numerous 50 fishing nets may be encountered further out.

At Kuei-shan tsui there are some earth cliffs which lie under a sharp hill with a tower on its eastern spur; a reef extends about one mile from the southern side of this point. An isolated hill, 756 feet (230^m4) high, rising about 3 miles north-westward of Kuei-shan

Chart 3480.

tsui, is reported to be prominent. Shih-chiu-so is a small town situated close north-westward of Shih-chiu tsui.

For the light on Shih-chiu tsui, *see* page 400.

About 7 miles northward of Shih-chiu tsui is Hsi-lung shan, an isolated hill, 1,373 feet (418^m5) high, terminating eastward in Yin-chia-t'ai tsui, a bluff which lies about 8½ miles north-north-eastward of Shih-chiu tsui. Hsi-lung shan and Ho shan, another isolated hill, 2,093 feet (637^m9) high, lying about 6 miles north-westward, are reported to be prominent.

Huang-chia-t'ang (Wangchiatang) wan is entered between Yin-chia-t'ai tsui and Tung-chia-k'ou tsui, situated about 8 miles north-eastward, at the southern extremity of a peninsula. The inner waters of this bay are filled with drying flats, but vessels with local knowledge can obtain shelter from northerly and north-easterly winds, in depths of from 3 to 5 fathoms (5^m5 to 9^m1), mud. Mu-kuan tao, 31 feet (9^m4) high and with a single tree on its summit, lies about one mile westward of Tung-chia-k'ou tsui. Two drying rocks, called Ku shih, lie about 2 miles south-westward of Mu-kuan tao, with another cluster of drying rocks about one mile north-north-westward of them.

Lang-ya-t'ai wan is an open bay entered between Tung-chia-k'ou tsui and Hu-chia-shan tsui, situated about 5½ miles east-north-eastward. At the head of the bay there is an indentation filled by a drying flat. An islet, 7 feet (2^m1) high, named Ya tao, lies about half a mile offshore about 1½ miles westward of Hu-chia-shan tsui.

Ch'i-tang (Chaitang) tao (*Lat.* 35° 37' N., *Long.* 119° 55' E.), an island lying off a point situated about 3 miles east-north-eastward of Hu-chia-shan tsui, terminates southward in a bluff about 230 feet high; the island is separated from the mainland by a narrow shallow channel. Vessels with local knowledge can find anchorage off the coast between Hu-chia-shan tsui and Ch'i-tang tao.

Li-ken wan is an open bay entered between Ch'i-tang tao and Ta-chu-shan tsui, situated about 7 miles north-eastward. There is an inner bay at the head of Li-ken wan, at the head of which are some prominent tall trees. Vessels with local knowledge can find anchorage in Li-ken wan.

Chart 1255.

Ta-chu shan, 1,675 feet (510^m5) high, is the summit of a rugged range extending about 5 miles north-north-westward from Ta-chu-shan tsui.

Ling-shan wan is an open bay entered between Ta-chu-shan tsui and Yü-ming tsui (Kaiser point), situated about 13 miles north-eastward.

Shui-ling-shan tao (Telosan), an island 1,663 feet (506^m9) high, situated about 8 miles east-north-eastward of Ta-chu-shan tsui, is precipitous near its southern end, whence it slopes towards its northern extremity. There are small rocks above water close off the northern and eastern extremities of this island. The channel between Shui-ling-shan tao and the mainland westward is called Ling-shan shui-tao.

Vessels with local knowledge can find anchorage on both the eastern and western sides of Shui-ling-shan tao.

Chart 1262.

Charts 857, 1255.

T'ang-tao wan (Arkona inlet) is an indentation at the northern end of Ling-shan wan, and extends about 4 miles north-eastward; Yü-ming tsui (*Lat. 35° 53' N., Long. 120° 10' E.*) is its south-eastern entrance point. Lao-ling shih, a rock 3 feet (0^m9) high, lies about 3 cables southward of Yü-ming tsui. The greater part of T'ang-tao wan dries, but a narrow channel, with depths of from 2½ to 4 fathoms (5^m0 to 7^m3), runs from the entrance to the middle of the inlet, and affords anchorage to small vessels with local knowledge, not exceeding 13 feet (4^m0) in draught, sheltered from all except southerly winds. Chui-tzu shih, which dries 3 feet (0^m9), lies in the middle of the entrance, and Fisher rock lies on the eastern side, just within the entrance. Tang tao is an islet on the western side of the entrance; there is a rock close north-eastward of it. Niu tao (tau), another islet, lies on the drying bank on the western side of the channel and nearly in the middle of the inlet. Ling-shan-wei, situated about a mile inland from the western shore of T'ang-tao wan, is a walled city of considerable commercial importance.

Chart 857.

Ta-mu (Ta-mo) shan, 2,300 feet (701^m0) high, situated about 2½ miles north-westward of Ling-shan-wei, is a prominent mountain which appears as a twin peak from westward.

Chart 3480

Light.—A light is exhibited, at an elevation of 65 feet (19^m8), from a white concrete tower, with its upper parts painted black, surmounted by a flagstaff, situated on Shih-chiu tsui (page 398). This light was reported to be extinguished, in 1947.

*Charts 857, 1255.***CHIAO-CHOU WAN AND APPROACH.—General remarks.—**

Chiao-chou wan (Kiaochow bay) is a large inlet entered about 10 miles north-eastward of Yü-ming tsui. The bay, which includes the important harbour of Ch'ing-tao chiang (Tsingtao harbour), offers well-sheltered accommodation for a considerable number of deep draught vessels. It is partially frozen over during severe winters, which set in about the beginning of December and end about March, but the ice is never thick enough to obstruct large vessels, although it may occasionally inconvenience small vessels and junks. The entrance is deep, as is also the southern part of the bay, but the north-western and northern parts are encumbered with extensive shoals and flats.

The general aspect of the land about the bay is barren, and the dry, parched soil, which is yellowish clay interspersed with occasional blocks of granite, has an uninviting appearance. See view facing page 402.

Chart 1255.

Islands and dangers in the approach.—Beacon.—T'a-lien tao or Cha-lien tao (Chalien tau) lies about 34 miles eastward of Yü-ming tsui and has a small hill in the middle; rocks above water lie within a quarter of a mile south-eastward of its eastern extremity, and foul ground extends about 2 cables from its south-western point. In spring and early summer dense fog hangs about the island, even when the coast is quite clear, and caution should be observed when approaching it, especially at spring tides, when the tidal streams are strong.

Chart 1262.

Chart 857.

Hsiao-kung (Siaukung) tao, situated about 15 miles west-north-westward of T'a-lien tao (*Lat.* $35^{\circ} 54' N.$, *Long.* $120^{\circ} 52' E.$), is a rocky islet 133 feet (40^m5) high. In 1935, fishing stakes were reported to extend north-eastward from Hsiao-kung tao to Katinau (chart 3735 5 and page 416).

Ta-kung (Taikung) tao, 386 feet (117^m6) high, lies about 4½ miles south-westward of Hsiao-kung tao, and from all directions resembles a haystack; Hsiao hsü (Tupfen islet), 141 feet (43^m0) high, lies about 4 cables west-north-westward of Ta-kung tao, and a rock, which dries 10 13 feet (4^m0), lies close off its north-western point. In May, 1935, H.M.S. *Berwick* passed between Ta-kung tao and Hsiao-kung tao and observed fishing nets, stakes and buoys, which appeared to occupy the whole channel.

Wu-ting chiao (Taikung-tao reef), situated about 1½ miles westward 15 of Ta-kung tao, dries 11 feet (3^m4). A square iron framework beacon 24 feet (7^m3) in height, painted red and black in horizontal bands, and surmounted by a white cylinder, stands on the reef.

Chart 1255.

Lights.—Fog signals.—A light is exhibited, at an elevation of 260 feet 20 (79^m3), from a white octagonal stone tower, 42 feet (12^m8) in height, on the summit of T'a-lien tao. A fog signal is sounded from the lighthouse.

Chart 857.

A light is exhibited at an elevation of 171 feet (52^m1), from a white iron framework tower, 38 feet (11^m6) in height, on the summit of 25 Hsiao-kung tao; a fog signal is sounded from the lighthouse.

A light is exhibited, at an elevation of 423 feet (128^m9), from a black circular iron tower, 26 feet (7^m9) in height, on the summit of Ta-kung tao; a fog signal is sounded from the lighthouse.

Charts 857, 1255.

Southern side of the approach.—Coast.—Danger.—The coast 30 between Yü-ming tsui and Hsiang tsui (Pile point), situated about 10 miles north-eastward, is the south-eastern side of Hai-hsi pan-tao, (Haishi) and is rocky; the southern part of this peninsula, which forms the south-eastern side of T'ang-tao wan, is about 300 feet (91^m4) 35 high, the northern part is also hilly, whilst the middle part is low and sandy. Liensan tao is a group of rocks above water lying on a reef which extends about half a mile from a point situated nearly 1½ miles north-eastward of Yü-ming tsui.

Chart 857.

Shih-ch'iao tsui (Arkona point) is situated about 5 miles north-eastward of Yü-ming tsui, and is fringed by reefs to a distance of about 2 cables. Chang-to tsui is a narrow point projecting about 3 cables south-eastward and situated about 3 miles east-north-eastward of Shih-ch'iao tsui. Lutao tsui and Tsopi tsui are projecting points lying about 8 and 45 5 cables, respectively, southward of Hsiang tsui (*Lat.* $36^{\circ} 01' N.$, *Long.* $120^{\circ} 18' E.$). Feng (Ti-tung) shan, a hill 518 feet (157^m9) high, situated about 6 cables westward of Hsiang tsui, is prominent.

Chart 1255.

Off-lying islands and dangers.—Buoy.—Beacon.—Shih-ling-tzu 50 chiao (Princess rocks), situated about 3 miles east-north-eastward of Yü-ming tsui, consists of two rocks which dry 7 feet (2^m1); a rock, with a depth of 5 fathoms (9^m1) over it, lies about one mile eastward of Shih-ling-tzu chiao.

Charts 3480, 1262.

Chart 857.

Chu-ch'a tao, situated about $3\frac{1}{2}$ miles southward of Hsiang tsui, has a flat summit, 114 feet (34^m7) high, and is inhabited; it is separated from the mainland by Chu-ch'a shui-tao (channel). Pin-lang (Pinliu) tao, 179 feet (54^m6) high, lies about 2 cables off the eastern side of Chu-ch'a tao, and is connected to it by a partly drying reef. Lien tao consists of two islets, 74 and 71 feet (22^m6 and 21^m6) high, respectively, lying about 2 and 3 cables, respectively, eastward of Pin-lang tao.

- 10 Pai shih (Haishi shoal), lying about $1\frac{1}{4}$ miles westward of the northern point of Chu-ch'a tao, has a least depth of $1\frac{1}{4}$ fathoms (2^m3) over it. A black buoy, No. 9, surmounted by a staff, is moored off the north-western side of this shoal.

- 15 Ku-tzu-yang (Ta-chiao tao), situated about $2\frac{1}{4}$ miles north-north-eastward of the northern point of Chu-ch'a tao, is a rock which dries 12 feet (3^m7). Hsiao-ch'iao tao (Haishi reef), lying about one mile south-westward of Ku-tzu-yang, has two heads, which dry 7 and 9 feet (2^m1 and 2^m7), respectively; it is marked by a round concrete beacon, 18 feet (5^m5) in height, painted in red and black horizontal bands and surmounted by a ball.

- Nan sha (Swallow bank) has several patches on it with depths of 5 fathoms (9^m1) and less over them; the shoalest patch, with a depth of $3\frac{1}{4}$ fathoms (6^m9) over it, lies about $1\frac{1}{4}$ miles eastward of Ku-tzu-yang. The summit of Huang tao (Chiposan) (page 413) in line with Hsiang tsui, bearing 302° , leads southward of Nan sha and northward of Ku-tzu-yang; see view facing this page. Hsi (Si) shan (page 409) in line with Chiao-tzu-shih tsui (Cape Evelyn), situated about three-quarters of a mile west-north-westward of Hsiang tsui, bearing 280° , leads northward of Nan sha; see view on
- 30 chart 857.

Light.—Fog signal.—A light is exhibited, at an elevation of 47 feet (14^m3), from an iron framework tower, painted red and black in horizontal bands, on Ku-tzu-yang. A fog signal is sounded from the lighthouse.

35 *Chart 3735.*

- Northern side of approach.—Coast.—Island.**—The northern side of the approach to Chiao-chou wan is formed by a high promontory, the south-eastern extremity of which, named Lao-shan t'ou (Cape Yatau), lies about $10\frac{1}{2}$ miles north-eastward of Hsiao-kung tao. Lao-shan t'ou (*Lat. $36^\circ 08' N.$, Long. $120^\circ 43' E.$*) is a vertical cliff about 300 feet (91^m4) high, and rises to a sharp hill, 741 feet (225^m9) high, which is perpendicular on its southern side. Within Lao-shan t'ou the land rises to a range of rugged limestone mountains, the highest peak of which, named Chu-feng ting (Lo ting), is 3,707 feet ($1,129^m9$) high and
- 45 lies about 5 miles north-westward of this cape. The depths off Lao-shan t'ou are very irregular; the tidal streams sometimes attain a rate of 2 knots, and there is a strong tide race.

Charts 857, 3735.

- The coast between Lao-shan t'ou and Nan-yao tao (Nan-yau peninsula), situated about $5\frac{1}{2}$ miles west-south-westward, is bold, rugged, and steep-to, except the shore of Liu-ch'ing-ho wan (bay), which lies immediately north-eastward of Nan-yao tao, and which is sandy. T'ai-ch'ing-kung k'ou (bay) is an inlet situated between Lao-shan t'ou and Liu-ch'ing-ho wan.

To face page 402.



Lighthouse on Ku-tzu yang
(Ta-chiao tao) not shown
(Established 1933).

a



Hsiang ts'ui (Pile Pt.) in line
with Huang tao (Chiposan),
summit bearing 302°, 4½ miles.

View, in two parts, of Chiao-chou wan (Kiaochow bay) approach: Mark for clearing Nan sha
(Swallow bank).
(Original dated 1866).

Chart 857.

Pao-yü tao (Steep island), 179 feet (54^m6) high, lies nearly three-quarters of a mile south-eastward of the south-eastern point of Nan-yao tao ; foul ground, with some rocks which dry, extends about 2 cables north-westward from the island. 5

Tung-chia wan.—Islands and dangers.—Anchorage.—Directions.—Hsü-fu tao or Ta-fu tao (Fu tao), an island 282 feet (85^m9) high, is separated from the south-western extremity of Nan-yao tao by a channel barely 1½ cables wide, with a least depth of 5 fathoms (9^m1) in the fairway. A shoal, with depths of less than 3 fathoms (5^m5) 10 over it, extends about half a mile westward from Hsü-fu tao, and Hsiao-fu (Little Fu) tao, an islet 30 feet (9^m1) high, lies on this shoal. Shih tao (Red rock), 30 feet (9^m1) high, lies about half a mile southward of Hsü-fu tao, with a deep channel between. 15

The main entrance to Tung-chia wan (Laoshan harbour) is between Hsü-fu tao and Fort point, situated nearly 1½ miles westward ; a reef, which partly dries, extends nearly half a mile south-eastward from Fort point. The depths in the entrance are from 3½ to 5 fathoms (6^m4 to 9^m1), but northward of the shoal extending from the western side of Hsü-fu tao is an area with depths of from 6 to 13 20 fathoms (11^m0 to 23^m8). The harbour affords good and secure anchorage.

K'ao-lao-tao t'ou (Middle point), with a hill on it, 269 feet (82^m0) high, is situated at the head of the harbour and divides it into two inner bays. Lao-shan k'ou, the eastern of the two, dries over the 25 greater portion. Sha-tzu-k'ou p'u (Sha-si-ko bay), the western, has depths of less than 3 fathoms (5^m5) ; the small village of Shatzu-k'ou (Sha-si-ko) is situated on a stream which flows into the head of this bay and can only be entered by boats at high water. Hsiao-lao shan (Horn hill), situated about 1½ miles north-westward of Fort 30 point, has a prominent sharp summit, 824 feet (251^m2) high.

The harbour can be entered with the eastern extremity of K'ao-lao-tao t'ou bearing 019° ; when Pao-yü tao opens northward of Hsü-fu tao course should be altered eastward, anchoring in a depth of 5 fathoms (9^m1), with Shih tao bearing about 146°, just open westward 35 of Hsü-fu tao, and the summit of Pao-yü tao bearing 091° and seen between Hsü-fu tao and Nan-yao tao. Vessels can also anchor further eastward, in the deep area situated northward of the shoal area extending from the western side of Hsü-fu tao ; junks anchor northward of this deep area, in depths of from 2 to 3 fathoms (3^m7 to 40 5^m5), good holding ground. The harbour can also be entered by the channel between Hsü-fu tao and Nan-yao tao, but the tidal streams in it are probably rapid at spring tides.

Coast.—Islets and dangers.—Anchorage.—Immediately westward of Fort point is a small cove which affords anchorage for junks ; a 45 reef, which partly dries, extends about half a mile south-eastward from its western entrance point. The large village of Chiang-kochuang is situated about a quarter of a mile up a river, which is often dry, flowing into the head of the cove.

About 2½ miles westward of Fort point (*Lat.* 36° 06' N., *Long.* 50 120° 32' E.) is Yen-tun chia, a bluff point from which foul ground, with depths of less than 3 fathoms (5^m5) over it, extends about a quarter of a mile southward ; a detached rock, with a depth of 3 fathoms (5^m5) over it, lies about 4 cables south-south-westward of

Chart 857.

Yen-tun chia. The open bay situated westward of Yen-tun chia is called Ta-chiang k'ou. Ch'ih tao (Chuensisian), an islet 18 feet (5^m5) high, surrounded by a reef, lies nearly 2 miles south-westward of

- 5 Yen-tun chia. The land behind Yen-tun chia is hilly, the highest peak being Kaiserstuhl, 1,235 feet (376^m4) high, situated nearly 1½ miles northward of it. A shoal, with a depth of 3 fathoms (5^m5) over it, lies about midway between Ch'ih tao and the coast north-westward. A rock, awash, lies close inshore nearly 1½ miles west-south-westward
10 of Ch'ih tao.

- Mai tao, an island, 125 feet (38^m1) high, situated about 1½ miles south-westward of Ch'ih tao, lies close to the coast and is connected to it by a ridge which dries. About midway between Mai tao and Lu-tou t'ou or Taiping chiao (Iltis peninsula), situated about 3½ miles
15 westward, is Kou-lan chia, a point 73 feet (22^m3) high; Fou-shan-so wan (Fu-shan-so bay) is entered between this point and Lu-tou t'ou, and Fou-shan-so (Fu-shan-so) is a town near its northern shore. A 4½ fathom (8^m2) rocky patch lies about half a mile south-south-westward of Kou-lan chia, with a 5-fathom (9^m1) patch between.

- 20 Pei sha (North shoal) consists of several patches, with depths of from 3½ to 5 fathoms (6^m4 to 9^m1) over them, lying within a distance of one mile south-eastward of Lu-tou t'ou. A 3½-fathom (6^m9) patch and a 4½-fathom (8^m7) patch lie about 1½ miles and 2½ miles, respectively, east-south-eastward of Lu-tou t'ou (*Lat.* 36° 03' N., *Long.*
25 120° 21' E.).

Anchorage.—Vessels can find anchorage, sheltered from north-easterly winds, off the coast between Fort point and Mai tao, in depths of from 8 to 10 fathoms (14^m6 to 18^m3), mud.

Charts 876, 857.

- 30 **Ch'ing-tao Chiang.**—**General remarks.**—Ch'ing-tao Chiang (Tsingtao harbour) occupies the entrance and south-eastern side of Chiao-chou wan. It consists of an outer and an inner harbour, called, respectively, Wai Chiang and Nei Chiang, the limits of which, as defined in Harbour regulations, are indicated by pecked lines on the chart and
35 described hereafter.

Pilotage.—**Quarantine.**—Pilotage is compulsory for all foreign vessels. The signal for a pilot is International Code flag G. The quarantine flag is also displayed by the Pilot boat. The quarantine officer accompanies the pilot.

- 40 Pilots will not take a vessel into or out of Nei Chiang unless special permission has been obtained from the Harbour authorities.

- Wai Chiang.**—**Islands and dangers.**—Wai Chiang or Outer harbour lies immediately within a line joining Lu-tou t'ou and Hsiang tsui, and extends westward to a line joining Chiao-tzu-shih tsui (Cape Evelyn)
45 and T'uan-tao tsui, situated about 1½ miles northward. Wai Chiang has moderate depths, soft mud and sand, affording good holding ground. With southerly winds, which are frequent in summer, a sea gets up; this, however, does not occur in winter, when northerly winds prevail.
Chart 857.

- 50 The northern side of Wai Chiang is indented by four small bays. Hsu wan (Iltis bay), the easternmost of these, is entered between Lou-tou t'ou and Hui-hsing chia (Hui-chuen point), lying about one mile westward; its shores are fringed by reefs, which extend nearly 1½ cables offshore in places.

Chart 857.

Chung hai (Augusta Victoria bay) is entered between Hui-hsing chia and a point lying nearly three-quarters of a mile north-westward; it has depths of less than 3 fathoms (5^m5) over its greater part, and a flat which dries occupies the head of the bay. A rocky shoal, with a least depth of 20 feet (6^m1) over it, lies about 4 cables westward of Hui-hsing chia. 5

Chart 876.

Ch'ing-tao k'ou (Tsingtao bay), situated immediately westward of Chung hai, has depths of less than 3 fathoms (5^m5), and a portion at the head of the bay dries. Ch'ing-tao chiao (Tsingtao reef), which partly dries, extends nearly 3 cables from the western entrance point of the bay. Ch'ing tao (Tsing tao) (Lat. 36° 03' N., Long. 120° 19' E.) lies about 2 cables westward of the eastern entrance point, with a shallow channel between, and protects the eastern part of the bay from southerly winds. A concrete pier extends about 2 cables south-south-eastward from the northern shore of the bay; landing can be effected at steps on either side, the outer ones having a depth of about 7 feet (2^m1) alongside. 15

The western side of T'uan-tao wan (bay), situated immediately westward of Ch'ing-tao k'ou, is formed by an island connected to the mainland by a reef, on which is a narrow causeway; the south-western extremity of this island is T'uan-tao tsui, and on it is a hillock, 44 feet (13^m4) high, named Yu-nei (Yunui) shan or T'uan tao. Hsia-an shan, an islet, 20 feet (6^m1) high, lies about one cable south-eastward of the south-eastern point of this island, and is connected to it by a reef which dries. Shoal water extends about 1½ cables southward from the islet and from T'uan-tao tsui. 25

Lights.—Fog signal.—Buoyage.—A light is exhibited, at an elevation of 101 feet (30^m5), from a white octagonal stone tower, 51 feet (15^m5) in height, on Ch'ing tao. Lights are exhibited on the head of the pier in Ch'ing-tao k'ou. 30

A light is exhibited, at an elevation of 82 feet (25^m0), from an octagonal brick tower, 50 feet (15^m2) in height, painted black and white in horizontal bands, on Yu-nei shan. A fog signal is sounded from the lighthouse. 35

A light-and-whistle-buoy, No. 12, painted red, and exhibiting a *white flashing light every three seconds*, is moored about three-quarters of a mile south-south-eastward of Ch'ing tao.

A red conical buoy, No. 10, is moored off the southern extremity of the 3-fathom (5^m5) line extending from Ch'ing-tao chiao. 40

A red bell-buoy, No. 8, is moored about 3 cables south-eastward of T'uan-tao tsui.

All the buoys in Chiao-chou wan and its approach are withdrawn from December to February, inclusive, owing to drift ice. 45

Dumping ground.—A circular area in which ammunition has been dumped, indicated by pecked lines on the chart, lies with its centre about 3½ cables south-eastward of Ch'ing tao.

Prohibited area.—The waters of Wai chiang and its eastern approach northward of Latitude 36° 02' N. between Mai tao and Yu-nei shan are included in a prohibited area. 50

Charts 876, 857.

Nei chiang.—General remarks.—Nei chiang or Inner harbour lies immediately westward of Wai chiang, and extends north-eastward.

Charts 1255, 3480, 1262.

Charts 876, 857.

The southern limit is a line joining Chiao-tzu-shih tsui and Hsien-lang tsui, situated about 2 miles west-south-westward; the western limit is a line joining Hsien-lang tsui and Huang-shan tsui, situated about 3 miles north-north-westward; the north-western limit is a line joining Huang-shan tsui and Koo-shan chiao a point on the mainland about 6 miles north-eastward.

Chart 876.

The northern part of Nei chiang is sheltered from southerly winds by Ch'ing-tao promontory, which terminates south-westward in Yu-nei shan; north-easterly winds raise a nasty sea, which frequently makes boatwork impossible. About three-quarters of a mile northward of Yu-nei shan is a hill 77 feet (23^m5) high, on which a number of radio masts are situated; the point on the north-western side of this hill is called Hsiao-pien tsui.

Harbour works, which include Ta chiang (Commercial harbour), have been constructed on the north-western side of Ch'ing-tao promontory, at the north-eastern end of Nei chiang. These, which are described hereafter, are divided into four districts.

Chart 857.

Dangers.—Fairway.—Buoyage.—Beacon.—Pier.—Heiku shih (Junk rock) lies about one mile south-eastward of the western entrance point of Hai-hsi wan, and dries 12 feet (3^m7).

Chart 876.

Anku shih (Bay rock) lies nearly 2 miles south-westward of Yu-nei shan, and dries 2 feet (0^m6); a black spar buoy, No. III, is moored about 2 cables north-eastward of this rock.

Middle ground, a shoal with a depth of 19 feet (5^m8) over it, lies nearly 2 miles north-westward of Yu-nei shan; a black spar buoy, No. 7, is moored off its eastern side.

Lang-ts'ang-tao shih (Horseshoe rock), is a large rocky shoal, which dries in parts, lying with its southern extremity about 1 $\frac{1}{2}$ miles northward of Yu-nei shan (*Lat.* 36° 03' N., *Long.* 120° 17' E.) and about 4 cables offshore. The south-eastern edge of this shoal is marked by a spar buoy, No. II, painted black and white in horizontal bands; the north-western extremity is marked by a light-buoy, No. 6, painted red and exhibiting a *white flashing light every three seconds*; the north-eastern extremity is marked by a conical spar buoy, No. I, painted red and white in horizontal bands.

The Fairway, the main channel to Ta chiang, which is indicated by pecked lines on the chart, and in which anchorage is prohibited, leads westward and northward of Lang-ts'ang-tao shih, and is marked by the following buoys:—

On the western side: black conical buoys Nos. 5, 3A, and 3, moored on the eastern edge of a flat, with depths of less than 5 fathoms (9^m1) over it, situated westward of Lang-ts'ang-tao shih. On the southern side: pillar light-buoys Nos. 4 and 2, each painted red, moored between Lang-ts'ang-tao shih and the entrance to Ta chiang: No. 4 exhibits a *red flashing light every three seconds*; No. 2 exhibits a *white flashing light every three seconds*. A black conical buoy, No. 1, is moored near the northern edge of the channel nearly half a mile from the entrance to Ta chiang.

There is also a narrow channel, with a least depth of about 19 feet (5^m8) in the fairway, south-eastward of Lang-ts'ang-tao shih. The

Charts 1255, 3480, 1262.

Chart 876.

north-western side of this channel is marked by No. II buoy, previously described ; the south-eastern side is formed by a bank, with depths of less than 3 fathoms (5^m5) over it, extending about 3 cables from the coast south-eastward of Lang-ts'ang-tao shih, and on this bank is Paiko shih (Barkass rock), marked by a granite pillar, 20 feet (6^m1) in height, painted black and white in horizontal bands and surmounted by a white cylinder. 5

A pier, known locally as the Back Bay Naval pier, extends from the coast about 3½ cables southward of Paiko shih ; this pier is for the use of boats from warships visiting the port. 10

A black spar buoy, No. 13, and a red spar buoy, No. 14, are moored about half a mile and one mile, respectively, westward of the entrance to Ta chiang.

Lights.—A light is exhibited from Anku shih. A light is exhibited, at an elevation of 40 feet (12^m2), from a circular tower, 36 feet (11^m0) in height, painted black and white in horizontal bands, on the north-western part of Lang-ts'ang-tao shih. 15

Anchorage.—There is anchorage north-eastward of Lang-ts'ang-tao shih (*Lat.* 36° 05' N., *Long.* 120° 17' E.). 20

In 1933, H.M.S. *Cornflower* anchored with Paiko-shih beacon bearing 192°, distant half a mile.

The Quarantine anchorages, indicated by pecked lines on the chart, lie westward and southward of Lang-ts'ang-tao shih, on either side of the Fairway. 25

Harbour works.—**Lights.**—**Buoy.**—**Beacon.**—**Anchorage.**—Hsiao chiang (Boat harbour), is a small artificial harbour, protected by two breakwaters, which has been constructed eastward of Lang-ts'ang-tao shih, and, in 1948, it had depths of from 8 to 16 feet (2^m4 to 4^m9). A pier, connected to the railway system, extends from the north-eastern side of this harbour, and there is a dry dock on the south-western side of the harbour ; for dimensions see Appendix 1 page 706. A red conical buoy is moored near the centre of the harbour. The area within a line joining the heads of the two breakwaters is known as Shiao-chiang district and provides anchorage for vessels of under 500 tons. 30 35

A light is exhibited, at an elevation of 19 feet (5^m8), from a red iron framework structure, 13 feet (4^m0) in height, on the head of the southern breakwater of Hsiao chiang ; a light is exhibited, at an elevation of 39 feet (11^m9), from a similar structure, 20 feet (6^m1) in height, situated about one cable south-south-eastward of the above light. These two lights in line, bearing 158°, lead to the entrance of Hsiao chiang from north-westward. 40

A light is exhibited, at an elevation of 19 feet (5^m8), from a green iron framework structure, 13 feet (4^m0) in height, on the head of the northern breakwater of Hsiao chiang ; a light is exhibited, at an elevation of 50 feet (15^m2), from a similar structure, 30 feet (9^m1) in height, situated nearly 4½ cables north-eastward of the preceding light. These two lights in line, bearing 054°, lead to the entrance of Hsiao chiang through the channel south-eastward of Lang-ts'ang-tao shih. 50

Another small harbour, known as Chung chiang lies immediately northward of Hsiao chiang ; its northern and north-western sides are formed, respectively, by No. 6 wharf and a breakwater. Tapao tao, a rock which dries 5 feet (1^m5), is situated at the outer end of

Chart 876.

the breakwater and is marked by a pyramidal beacon, 20 feet (6^m1) in height, painted black and white in horizontal bands and surmounted by a black cylinder. Rocks, with depths of less than 6 feet (1^m8) over them, extend nearly half a cable from Tapao tao. The area within a line joining the heads of the breakwaters enclosing Chung chiang is known as Chung-chiang district, and provides anchorage for vessels of under 500 tons.

There is a boat harbour, known as Chuen-chu chiang between the northern side of No. 6 wharf and No. 1 wharf of Ta chiang (*see below*). The head of this area is known as Chuen-chu-chiang district, and is reserved as an anchorage for harbour craft.

Ta chiang.—**Depths.**—**Lights.**—**Buoys.**—**Signal station.**—**Tide gauge.**—**Anchorage.**—**Berthing signals.**—Ta chiang (Commercial harbour) is formed by No. 5 Mole, a curved structure extending from the coast about 1½ miles north-eastward of Hsiao chiang; a breakwater extends about 1½ cables westward from the head of No. 5 Mole and a submerged obstruction, indicated by pecked lines on the chart, extends about 2 cables further westward.

The entrance lies between the extremity of No. 5 Mole (*Lat.* 36° 05' N., *Long.* 120° 18' E.) and the extremity of No. 1 wharf, which extends westward from the coast for a distance of about 3½ cables. Nos. 2, 3, and 4 wharves are situated parallel to and north-eastward of No. 1 wharf. The four wharves and the mole are connected to the railway system. The area within a line drawn south-eastward from the head of the breakwater is known as Ta-chiang district, and provides anchorage for vessels over 500 tons.

The depths in the harbour and entrance are less than are shown on the chart and, in 1948, a depth of only 24 feet (7^m3) was reported. Four conical buoys mark the edge of the shoal water extending from the head of the harbour.

A light is exhibited, at an elevation of 21 feet (6^m4), from a green iron framework structure, 14 feet (4^m3) in height, on the extremity of No. 5 Mole. A light is exhibited, at an elevation of 21 feet (6^m4), from a similar structure on the head of No. 1 wharf.

There is a signal station at the head of No. 5 Mole.

There is a signal station and a tide gauge on the head of No. 1 wharf.

A light is exhibited, at an elevation of 43 feet (13^m1), from an orange coloured iron framework structure surmounted by a cage, 36 feet (11^m0) in height, on the northern side of the head of No. 2 wharf; a light is exhibited, at an elevation of 71 feet (21^m6), from a similar structure, 66 feet (20^m1) in height, situated about 6 cables east-north-eastward of the preceding light. These two lights in line, bearing 074°, lead through the channel between the flats into the entrance of Ta chiang.

Berthing signals for Ta chiang are made from the signal station on the head of No. 1 wharf; the berth is indicated by hoisting the wharf number above the berth letter by flags of the International Code of Signals.

A red and white burgee hoisted by day, and a *white* light over a *red* light at night, denotes that a vessel may proceed into Ta chiang. A blue and white pendant by day, and a *white* light over a *green* light at night, denotes that a vessel may leave the harbour. Vessels must not enter or leave the harbour until the appropriate signal is hoisted.

Charts 857, 1255, 3480, 1262.

Charts 857, 1255.

Directions.—Vessels approaching Chiao-chou wan from southward should make T'a-lien tao (page 400), or its light at night, and then steer to pass north-eastward of Ta-kung tao and direct for the entrance. On approaching the bay, the rugged crest of Fou (Lung) shan, situated about $1\frac{1}{2}$ miles northward of Mai tao, is 1,260 feet (384^{m0}) high and prominent. Chan shan (Nubble hill), 490 feet (149^{m3}) high, situated about $1\frac{1}{2}$ miles northward of Lu-tou t'ou, has a cairn on its summit; about 4 cables westward of Chan shan is a square granite pillar with a triangular top, standing on a hill 260 feet (79^{m2}) high. Ta-mu shan, situated on the southern side of Chiao-chou wan and described on page 400, is very prominent; this range runs in a northerly direction for about 5 miles to Hsi (Si) shan, (Lat. $36^{\circ} 03' N.$, Long. $120^{\circ} 06' E.$), 1,083 feet (330^{m1}) high.

Tidal streams.—The tidal stream runs into Chiao-chou wan during the rising tide at a general rate of from one to 2 knots, although in the entrance a rate of from 3 to 4 knots is stated to have been experienced; the stream runs out of the bay when the tide is falling at about the same rate. The tidal streams turn regularly at about the times of local high and low water or about 8 hours after high and low water, respectively, at Shimonoseki (Admiralty Tide Tables Standard Port).

Tide rips may be experienced on the northern side of the entrance to the bay within a distance of about one mile from Yu-nei shan.

Chart 857.

City of Ch'ing-tao.—The city of Ch'ing-tao (Tsingtao), which is entirely modern, is situated on the promontory between Ta chiang and Ch'ing-tao k'ou, the residential quarter being on the shores of the latter, whilst the industrial quarter borders the north-western coast of the promontory. The population, in 1952, was about 756,000. The two large chimneys of the electricity works, situated close southward of Hsiao chiang, are conspicuous.

Chart 876.

Harbour facilities.—Supplies.—Communications.—There is ample accommodation for ocean-going vessels in Ta chiang, with depths of from 27 to 30 feet (8^{m2} to 9^{m1}) alongside. The faces of the wharves are reported to slope outwards below low water level, and involve risk of damage to inboard propellers if the stern is too close to the wharf.

Application for a berth must be made at least a week in advance, and earlier if possible.

Cargo is ordinarily handled by ship's gear and coolie labour.

Minor repairs only can be undertaken. Dry docks are available; for the dimensions of the largest *see* Appendix I, page 706.

There are two good hospitals at Ch'ing-tao, and also a Sailors' Home.

Fresh provisions are plentiful; provisions from cold storage can be obtained, but as much notice as possible should be given for large supplies. Water can be obtained at the wharves. There are normally large stocks of coal; vessels can take in coal alongside the wharves or from lighters. Coal was reported to be scarce, in 1948. A small quantity of Diesel oil is available and can be shipped alongside the wharf.

There is railway communication with Chi-nan (Tsinan-fu), the capital of the Shantung province. Ch'ing-tao is connected to the general telegraph system. There is regular communication by sea

Charts 3480, 1262.

Chart 876.

with Hong Kong, Shang-hai, and Yen-t'ai (Chefoo) and also with Japan.

There is a radio station at Ch'ing-tao ; see page 39.

- 5 **Signal station.—Storm signals.**—There is a signal station on Wan-men shan (Diedrich's hill) (*Lat. 36° 04' N., Long. 120° 19' E.*), situated close eastward of the city of Ch'ing-tao and another on Hui-hsing chia. Storm signals are made from the Observatory, situated on the summit of a hill lying about a quarter of a mile north-westward of Wan-men shan ; the signal station at Ta-chiang ; and a signal station near Hsiao chiang. See page 407.

Port signals.—The following signals, by flags of the International Code of Signals, together with, in certain cases, equivalent night and sound signals, were in use in Ch'ing-tao chiang in 1953 :—

15	Signal	Meaning
	Flag A . . .	Vessel is testing speed
	Flag B . . .	Dangerous or inflammable cargo on board. At night, a <i>red</i> light is hoisted
20	Flag H . . .	Pilot on board. At night, a <i>red</i> light over a <i>white</i> light
	Flag L . . .	Custom's officer required
	Flag P . . .	To sail soon
	Flag W . . .	Drinking water wanted (for use at wharf)
25	Flag Y . . .	Mails on board
	Flags DV . . .	Vessel leaking, help required
	Flags FS . . .	Ash boat required
	Flags FU . . .	Water boat required
30	Flags NC . . .	In distress, immediate help required
	Flags NQ . . .	Fire tender required. At night, three lights <i>green, white, red</i> , vertically disposed. Continuous bell or whistle
35	Flags ST . . .	Police wanted
	Flags TE . . .	Vessels passing are requested to reduce speed
	Flags YA . . .	Tug wanted
	Flag S above	
40	Answering pendant.	Vessel wishes to communicate with the Signal station
	Flags GOS . . .	Vessel is being fumigated
	First substitute over flags IS . . .	Vessel leaving dock; other vessels keep clear
45		

A green flag over a red flag, by day, or a *green* light over a *red* light by night, indicates a vessel with divers down.

A red flag over a black ball, by day, or three lights, *red, white, red*, vertically disposed, by night, indicates a dredger.

- 50 **Trade and shipping.**—The principal exports are coal, salt, ground-nut oil, tobacco, eggs, and cattle ; the imports are timber, cotton yarn, and sugar.

In 1948, 3,058 steam vessels with an aggregate of 2,277,772 tons, entered the harbour.

Chart 876.

Harbour regulations.—The following are extracts from the Harbour regulations for Ch'ing-tao chiang, promulgated in November, 1953.

3.—(a) The term "Vessel" shall apply to craft of any size, with or without motors. 5

(b) The terms "Motor vessels" and "Steamers" shall apply to any vessels with an engine (including sailing junks with motors).

(c) The term "Motorless vessels" shall apply to any vessels propelled by man-power, sail, or in tow.

(d) The term "Towing launches" shall apply to any vessel capable of towing, and used solely for that purpose. 10

8.—Any vessel of over 500 tons intending to enter the harbour should inform the Chief Supervisor 8 hours prior to the time of her arrival. The message should, in addition, contain the definite time of arrival, and the draught forward and aft. Should the vessel be carrying dangerous cargo, the Chief Supervisor must be informed of its nature and quantity. 15

9.—Foreign vessels wishing to enter the harbour must apply for permission to this office 48 hours in advance. Permission for clearance must be obtained 24 hours in advance. No vessel may enter or leave the harbour without permission from the Chief Supervisor. 20

11.—Vessels entering or leaving the harbour after sunrise or before sunset should hoist the following flags and signals:—

(a) *Chinese vessels.*—Chinese flag, Company ensign, and their Signal letters (non-registered vessels may waive the hoisting of their Signal letters), and other requisite signals. 25

(b) *Foreign vessels.*—National flag, Company ensign, their Signal letters, and other requisite signals.

12.—Vessels entering or leaving the harbour (excluding vessels under 200 tons) should obey the instructions of the Signal station on Wan-men shan. If, owing to bad weather the signals from Wan-men shan are not visible, the signals from the nearby Signal station at Hui-hsing chia are to be obeyed. 30

13.—Vessels entering or leaving Ta-chiang district should obey signals from the Signal station at Ta chiang. 35

14.—Vessels which are subject to quarantine inspection before entering the harbour should hoist the quarantine signals, and anchor in the quarantine anchorage pending inspection. Vessels should obtain the "Permit" or "Restricted permit" from the Quarantine Authority before entering harbour. The signals to be used are as follows:— 40

(a) Vessels from foreign or Chinese infected ports, if the health of the crew, passengers, or live-stock is normal

By day.—International Signal Code flag Q. 45

By night.—Three red lights, vertically disposed.

(b) If there is suspicion of infectious disease among the crew, passengers, or live-stock, during the voyage.

By day.—International Signal Code flags QQ.

By night.—Four lights, red, red, white, red, vertically disposed. 50

(c) If death has occurred among the crew, passengers, or live-stock, during the voyage, or if there is a corpse on board.

By day.—International Signal Code flags QL.

By night.—Four lights, red, white, red, white, vertically disposed.

Charts 857, 1255, 3480, 1262.

Chart 876.

In the event of cases covered by (b) and (c) being discovered on board, they should immediately be reported to the Chief Supervisor.

16.—When a vessel is in harbour, the following instruments and
5 equipment may not be used :—

(a) *Chinese vessels*.—Receiving and transmitting radio sets (except for receiving weather reports).

(b) *Foreign vessels*.—Receiving and transmitting radio sets,
10 sounding machines, radar, compass, weapons of self-defence, signalling apparatus, cameras, binoculars, telescopes, sextants and surveying instruments.

17.—Any foreign vessel intending to take shelter from a typhoon in the harbour should obtain permission from the Chief Supervisor beforehand.

18 20.—Movement of vessels within the harbour limits should be at dead slow speed. A good distance should be kept between vessels to avoid collision, and an anchor should at all times be ready for letting go.

21.—Vessels passing dredging craft etc. should proceed at the
20 lowest speed.

22.—When vessels are moving in the harbour, their boats, gangways, etc. should be turned in.

24.—Vessels are not allowed to navigate in the harbour during dense fog, or heavy snow or rain which may affect visibility. If
25 vessels are already under way, they should anchor clear of the fairway.

25.—With the exception of tugs, no vessels are allowed to tow other craft unless permission has been obtained from the Chief Supervisor.

27.—The training of life-boat crews within Ta chiang is not
30 allowed. The life-boats of Chinese vessels may be lowered in the harbour, and may proceed outside Ta chiang for training. No sailing junks are permitted to sail in Ta chiang, Chung chiang, and Hsiao chiang.

29.—A written application to berth or shift vessels should be
35 made to the Harbour office beforehand. After approval vessels may be shifted or berthed. No berth may be used without approval. Application should be made for a pilot by all foreign vessels, or Chinese vessels of over 1,000 tons, when shifting.

31.—Vessels alongside wharves should make fast their ropes to the
40 specified places. No anchors are permitted to be placed on the bund.

37.—Vessels alongside wharves are not allowed to test their propulsion machinery for long periods.

38.—Vessels in harbour are not allowed to leave harbour or shift berth without permission from the Chief Supervisor and the Whar-
45 finger of the Harbour office.

55.—Vessels carrying explosives, combustible materials, and/or those capable of spontaneous combustion, are not allowed to berth in the harbour without the permission of the Chief Supervisor.

80.—The dumping of ballast, coal waste, garbage, or rubbish,
50 into the harbour is forbidden. Application for a vessel to clear such rubbish must be made. For infringement of these regulations the offender is liable to be fined. The Chief Supervisor has the right to order the offender to clear what has been dumped within a specified time.

Chart 876.

81.—Without the permission of the Chief Supervisor, a vessel is not permitted to ground, or to test its engines, etc. while in the harbour.

87.—After the typhoon signal (see page 26) has been hoisted, the entire crew of every vessel should return to their place of duty. The Master of a vessel is responsible for the command and security of his vessel until the signal is hauled down.

107.—Foreign crews and foreign passengers are not allowed to land without permission from the controlling authorities.

117.—It is forbidden to sound the ship's siren while at anchor in the harbour for no definite purpose.

122.—The dumping of oil or oil substances overboard or on to the bund is absolutely forbidden. The cleaning of bilges and oil tanks within the harbour limits or to westward of Takung tao is also forbidden.

Climatic table.—See Chapter I, page 72.

Chart 857.

Inner part of Chiao-chou wan.—Islands and dangers.—Buoys.

Hai-hsi wan (Haishi bay), situated on the southern side of Nei Chiang, is entered between Chiao-tzu-shih tsui and Hsien-lang tsui, and is divided into two parts by a wedge-shaped promontory named Tao-kuan tsui. Hai-hsi wan is shallow and its head dries; its eastern arm is called Hsiao-ch'a wan, and its western arm Hsieh-chia-tao wan.

Huang-tao wan (Hwangtao bay) lies immediately westward of Hai-hsi wan, and is entered between Hsien-lang tsui and Ta-shih-t'ou tsui or Ta-shih t'ou, (Crane point) situated about 4 miles north-westward. A flat, which dries, extends nearly 2 miles from the western shore of the bay; Huang tao (Chiposan), an island, 177 feet (53^m9) high, with several villages on it, lies on the northern part of this flat, with an islet, named Kantau, off its south-western side.

Chien chiao (Hwangtao shoal), with a least depth of 2½ fathoms (5^m0) over it, lies about half a mile northward of the northern point of Huang tao.

Hungshi yai (Bluff point), about 50 feet (15^m2) high, lies about 2½ miles west-north-westward of Ta-shih-t'ou tsui (*Lat.* 36° 04' N., *Long.* 120° 12' E.).

The north-western part of Chiao-chou wan has no distinguishing features, and the almost level land, from about 70 to 180 feet (21^m3 to 54^m9) high, is fronted by extensive mud flats, which dry out to as much as 4½ miles offshore.

Ku (Gau) shan is a hill, 333 feet (101^m5) high, lying on the eastern shore of Chiao-chou wan, and about 2 miles north-eastward of Ta Chiang; Li-ts'un ho (river) flows out about 1½ miles north-eastward of this hill, but a flat, which dries, extends from the shore off its mouth. Ts'ang-k'ou wan (Tsangkow bay) is situated on the eastern side of the bay between the mouth of Li-ts'un ho and Cliff point, situated about 2½ miles northward. Shih-men (Tunglau) shan, 1,969 feet (600^m1) high, situated about 8 miles north-eastward of Ku shan, is prominent, and its summit resembles a tower.

Yin tao, a large island, lies on the mud-flat extending from the northern shore of Chiao-chou wan; its highest part, near the middle of the island, is 194 feet (59^m1) high. A shoal, with depths of less

Charts 1255, 3480, 1262.

Chart 857.

than 3 fathoms (5^m5) over it, extends about 5 miles southward from the south-eastern extremity of Yin tao; a red spar buoy, No. 14, described on page 407, marks the southern extremity of this shoal.

- 5 Ts'ang-k'ou channel (Tsangkoer deep), with depths of from 3 to 8 fathoms (5^m5 to 14^m6), runs northward between this shoal and the flats extending from the eastern shore of Chiao-chou wan; the entrance lies between No. 14 buoy and a black spar buoy, No. 13, also described on page 407.

- 10 Yin-tao wan (bay) is situated on the south-western side of Yin tao, close eastward of Jasper point, its south-western extremity. South point lies about 2½ miles east-south-eastward of Jasper point, and Lanaing point about 1½ miles east-north-eastward of South point. Devils reef, drying 7 feet (2^m1); Angels reef, drying 5 feet (1^m5); and Mao tao or Hsiao tao, (Fisher islet) about 15 feet (4^m6) high, lie off the south-eastern end of Yin tao, between South point and Lanaing point. Lubbert point lies on the eastern side of Yin tao, about 2½ miles northward of Lanaing point.

- Nü-ku-k'ou (Nukuko) (*Lat.* 36° 14' N., *Long.* 120° 20' E.), situated in the north-eastern corner of Chiao-chou wan and about 3 miles north-westward of Cliff point, and Pan-ch'iao-fang (Tsangkow), at the head of Ts'ang-k'ou wan, are the ports for junks trading with the city of Chi-mo (Tsimo), situated about 10 miles up Shih-ch'iao (Nan) ho, which flows into the north-eastern part of Chiao-chou wan.

- 25 Chiao-hsien (Kiaochow) (chart 1255), which was formerly the principal emporium in the eastern part of Shantung, is situated about 5 miles inland from the western shore of Chiao-chou wan. T'a-pu-t'ou (Taputo), situated in the north-western corner of the bay, is the port for junks trading with this city; the port is reached by a narrow, intricate channel, named Ku ho, marked by buoys, and its upper part is only navigable at high water.

Anchorage.—There is anchorage for junks as indicated on the chart at the northern end of Ts'ang-k'ou channel, and off the entrance to Ku ho.

35 *Chart 1255.*

COAST.—Lao-shan t'ou to Mu-yeh tao.—General remarks.—

- From Lao-shan t'ou (page 402) the coast trends generally east-north eastward for about 100 miles to Mu-yeh tao (Mu-i tau). This stretch of coast, which forms the southern side of Shan-tung pan-tao (peninsula), is generally hilly and is indented by a number of bays and inlets, none of which are of much importance. Islets and dangers lie off the coast in places, but only Ch'ien-li yen (Surveyor island) and Katinau (page 416) are much more than 5 miles offshore.

Chart 3735.

- 45 **Lao-shan wan.—Coast.**—In Lao-shan wan (Lo shan bay), which is entered between Lao-shan t'ou and Ch'an-shan t'ou or Cape Adkins, situated about 16½ miles north-eastward, the depths are fairly regular, decreasing gradually towards the northern part of the bay. Yaotao wan is a small bay close northward of Lao-shan t'ou.
- 50 The western shore, between Lao-shan t'ou and Village point, situated nearly 9 miles northward, is bold and rugged, and is indented with a few small sandy bays; Village point is the extremity of a small promontory about 150 feet (45^m7) high, and about 1½ miles southward

Chart 3735.

of it is Feng-shan hsi (Feng shan), a barren hill 403 feet (122^m8) high. Wang-ko-chuang k'ou (bay), a small bay situated on the western side of this promontory, is filled with a flat which dries; on the north-western side of this bay is a headland 289 feet (88^m1) high. Hsiao-tao wan (Hsiao-tao bay) is entered between this headland and Ao-shan t'ou (Centre head), lying about 3½ miles north-eastward; the head of this bay dries out to about three-quarters of a mile. Ao-shan t'ou has a double-topped hill on it, 502 feet (153^m0) high, and about 1½ miles west-north-westward of this hill is Kao shan (Dome hill), a dome-shaped hill, 758 feet (231^m0) high; Pao shan (Sugarloaf), a hill, 858 feet (261^m5) high, lies nearly 5½ miles west-north-westward of Ao-shan t'ou. 5

Pei wan (Great bay), forming the northern part of Lao-shan wan, is entered between Ao-shan t'ou and Ch'an-shan t'ou; its shores are comparatively low, but Ch'uan-ku (Chuangkou) shan rises to an elevation of 853 feet (260^m0) at the head of the bay. Ch'an shan (Boulder hill), situated at the south-western end of the promontory forming the eastern side of Pei wan, is surmounted by granite boulders, which extend some distance down its sides, and it is a good landmark. The shore of Pei wan are mostly fronted by mud and rocks, drying out as much as 2 miles in places. Tsang-tsien is a village situated at the head of Pei wan. 15 20

Ch'an-shan t'ou is cliffy, and has a hill on it 239 feet (72^m8) high. Ling-k'ou tao, a small islet, 85 feet (25^m9) high, lies about half a mile north-north-eastward of the cape, and is connected to the coast by a shingle spit, which dries. 25

Islands and dangers in Lao-shan wan.—A 4½-fathom (8^m2) patch lies about 2½ miles northward of Lao-shan t'ou and fully one mile offshore. Matterson island, 190 feet (57^m0) high, lies about 7½ miles north-eastward of Lao-shan t'ou, and a reef lies about 1½ cables off its northern end. Dwishen rocks, with a depth of less than 6 feet (1^m8) over them, lie about half a mile south-westward of the southern point of Matterson island, and about a quarter of a mile further west-north-westward is a similar group of rocks; both these groups appear to break only in heavy weather. 30 35

Ta tao, 328 feet (100^m0) high, lies about 2 miles westward of Matterson island; its northern end is low and narrow. Ta-tao rock lies about a quarter of a mile southward of Ta tao and dries 10 feet (3^m0). Nutze tao, 131 feet (39^m9) high, lies about 1½ miles south-westward of Ta tao, and appears double from some directions. Shitze tao, 125 feet (38^m1) high, consists of two islets lying together on a reef which dries; the eastern and larger islet lies nearly 1½ miles westward of Ta tao. A rock, which dries 3 feet (0^m9), named Vorklippe, lies about 4 cables northward of the eastern islet. 40 45

Data rock (*Lat.* 36° 15' N., *Long.* 120° 42' E.), 5 feet (1^m5) high, lies about 1½ miles north-westward of Shitze tao; a rock, with a depth of 2½ fathoms (4^m1) over it, lies about 6 cables north-north-westward of Data rock. Totze tao, 98 feet (29^m9) high, lies about 1½ miles northward of Data rock, and about a quarter of a mile further northward is Wan (Hsiao) tao, with a round summit, 239 feet (72^m8) high. Neilson rock, awash, lies nearly one mile north-westward of Wan tao. 50

Adkins rock, lying about half a mile southward of Ch'an-shan t'ou, is 6 feet (1^m8) high; Nü tao (Mau tau), 236 feet (71^m9) high, situated

Chart 3735.

about $1\frac{1}{2}$ miles westward of Adkins rock, is connected to the coast at the foot of Ch'an shan by a stony ridge which dries; this island is green in spring and brown in winter. Some rocks above water lie close off the south-western side of Nü tao. East reef lies about 2 miles west-south-westward of Nü tao, and is generally marked by breakers; Ch'an-shan bearing 063° , and open southward of Nü tao, leads southward of East reef. Hsing chiao or Star rock (Star reef) lies about one mile west-north-westward of Nü tao and dries; there are three rocks above water near the middle of this reef, one of them being 18 feet (5^m5) high. There is a safe passage, with a least depth of 5 fathoms (9^m1), between Hsing chiao and East reef. A rock awash lies about half a mile north-eastward of Hsing chiao.

West reef lies about 2 miles northward of Ao-shan t'ou and about 6 cables off the western shore of Pei wan. North reef lies in the middle of Pei wan and about $4\frac{1}{2}$ miles north-north-eastward of Ao-shan t'ou, and is a large flat rock, which dries 12 feet (3^m7).

Anchorage.—Pei wan affords good shelter from north-easterly winds, in a depth of $5\frac{1}{2}$ fathoms (9^m6), with the rocks on Hsing chiao bearing about 333° , and the southern extremity of Nü tao bearing 086° ; Adkins rock (*Lat. $36^\circ 22' N.$ Long. $120^\circ 53' E.$*) will then be visible just open southward of Nü tao. The bottom, however, is very rocky, and the depths decrease rather suddenly northward of this position.

Small vessels can obtain good shelter, in a depth of $2\frac{1}{2}$ fathoms (4^m1), about 3 cables north-north-westward of Hsing chiao, which forms a good breakwater at low water; at high water, however, an unpleasant sea sometimes set in.

In Pei wan, westward of Hsing chiao, dangerous rollers set in with gales, and continue even after the wind has subsided, but these were not noticed along the coast in the southern part of Lo-shan wan. During summer it is imprudent to anchor off this coast, as winds from between east-north-east and south-east are frequent then, and at times blow hard, though rarely lasting more than 12 hours. In winter, winds from between north-north-east and north-west prevail, chiefly in the latter quarter near the land, but in the former in the offing; sometimes there are gales of short duration from south-west, backing to south.

Outlying islands.—Katiniau, 243 feet (74^m1) high, lies about 11 miles east-north-eastward of Lao-shan t'ou, and some rocks, including one 111 feet (33^m8) high, lie close off its southern side. Nagato iwa, a rock awash, lies nearly half a mile north-north-eastward of the northern point of Katiniau. See view below.



*Katiniau, bearing 210° , 24 miles.
(Original prior to 1880).*

Ch'ien-li yen (Surveyor island), situated about 22 miles eastward of Katiniau, is divided into two portions by a narrow, perforated

Charts 1255, 3480, 1262.

Chart 3735.

neck ; the southern and higher part is 297 feet (90^m5) high and very rugged. During spring the island is often obscured by fog, which is very prevalent in the offing, although it may be quite clear near the coast.

Coast.—Islets and dangers.—Anchorage.—The coast between Ch'an-shan t'ou (*Lat. 36° 23' N., Long. 120° 53' E.*) and South head, situated about 10½ miles north-north-eastward, is generally unapproachable on account of rocky and shoal ground, and is fronted by several islands and reefs. A smooth and somewhat flat-topped hill, 561 feet (171^m0) high, is situated about 2½ miles north-north-eastward of Ch'an shan, and between is a group of lower and very rugged hills covered with boulders. The land north-westward of these hills, across the isthmus which divides Pei wan and Salt bay (*see below*), is low and flat.

The southern entrance point of Salt bay lies about 2½ miles north-north-eastward of Ch'an-shan t'ou ; a spit, which dries, extends about 1½ miles south-eastward from this point, and on it are Pang-tou-chuang, 121 feet (36^m9) high, and three other islets. Salt bay is filled by a mud flat, the greater portion of which dries. Hung tao (Chung tau) lies off the entrance to Salt bay, and is undulating, with a hill 173 feet (52^m8) high on its western part ; a reef, which dries, lies about half a mile off the northern coast of the island, and is connected to it by rocky ground, which also dries. End island, which is 63 feet (19^m2) high and covered with grass, lies about 3 cables off the eastern point of Hung tao, with foul ground between. Che tao (tau), another grassy island, 116 feet (35^m4) high, lies nearly 1½ miles north-eastward of End island ; its eastern coast and northern and southern extremities are low cliffs. A reef, with depths of not more than 3 fathoms (5^m5) over it, extends about 2 cables north-westward from the northern point of Che tao. Che-tao (Che-tau) reef, lying about a quarter of a mile southward of Che tao, has depths of less than 3 fathoms (5^m5) over it ; on the middle of the reef is a rock 24 feet (7^m3) high. A 3¾-fathom (6^m9) patch lies about half a mile south-south-eastward of Che-tao reef.

The promontory forming the northern side of Salt bay has a hill on it 266 feet (81^m1) high, called Yang shan, which shows a double summit from some directions. Huang shan (Temple hill), situated about 2 miles north-westward of Yang shan, is 820 feet (249^m9) high and has a joss-house on its summit ; Kwan shan is a range of hills, the summit of which is 824 feet (251^m2) high and is situated about 1½ miles north-westward of Huang shan.

Tiger bay, situated immediately southward of South head, has depths of less than 3 fathoms (5^m5), and a flat, which dries, extends as much as one mile from the head of the bay. Ching tao (San-pin-chuang) is an island 52 feet (15^m8) high, lying about 1½ miles north-eastward of the southern entrance point of the bay ; a reef, which dries, extends about a quarter of a mile from the eastern point of the island, and a reef, which partly dries, extends nearly one mile north-eastward from the southern entrance point of the bay.

Anchorage can be obtained, in depths of from 2½ to 3¾ fathoms (5^m0 to 6^m9), between Ching tao and Che tao, sheltered from south-westerly winds.

South head rises to a steep hill, 253 feet (77^m1) high, on which

Charts 1255, 1256, 3480, 1262.

Chart 3735.

is an abandoned castle; this hill is the easternmost of a range of small hills lying northward of the sandy plain which lies at the base of Kwan shan, and from the southward it appears almost disconnected
5 from the mainland.

Ting-tzu chiang.—**Islands and dangers.**—**Anchorage.**—Ting-tzu chiang (Ting-tsi river) is a deeply penetrating inlet, mostly occupied by mud flats which dry, and is entered between South head and a point lying about 3 miles north-eastward. Chin-chia-k'ou (Chin-chia-ko)
10 is a town situated at the head of the inlet.

Bar islet (*Lat.* $36^{\circ} 32' N.$, *Long.* $121^{\circ} 03' E.$), situated about 4 miles eastward of South head, has a round, grassy summit, 99 feet (30^m2) high, and cliffy coasts fringed with rocks. Two patches of rocky ground, with depths of from three-quarters to one fathom
15 (1^m4 to 1^m8) over them, lie within a distance of $1\frac{1}{4}$ miles south-eastward of Bar islet. Vanhear patch, lying about half a mile north-eastward of Bar islet, has a least depth of 4 feet (1^m2) over it. A rock, with a depth of less than 6 feet (1^m8) over it, lies about $1\frac{1}{2}$ miles north-eastward of Bar islet. A least depth of $1\frac{1}{4}$ fathoms (2^m3)
20 can be carried over the bar, about $1\frac{1}{4}$ miles southward of Bar islet; it is mainly sand, but there is rock in places. Within the bar there is a narrow channel with depths of from 3 to 8 fathoms (5^m5 to 14^m6).

On the southern side of the channel a drying bank extends about $1\frac{1}{2}$ miles eastward from South head, and thence a bank, with depths
25 of less than one fathom (1^m8) over it, extends a further 3 miles east-south-eastward. On the northern side, partially drying banks extend to within about half a mile of Bar islet. Entry should not be attempted without local knowledge.

A prominent hill, 517 feet (157^m6) high, with old fortifications on it,
30 is situated on the southern side of the inlet and about $2\frac{1}{2}$ miles westward of South head. Ruin hill, 437 feet (133^m2) high, is situated about 6 miles west-north-westward of South head. A hill, 292 feet (89^m0) high, rises from the level land on the northern entrance point of the inlet; Triangle hill, situated about $4\frac{1}{4}$ miles northward of
35 South head, has a sharp summit, 540 feet (164^m6) high.

Outer cape is the northern extremity of Pe-shan pan-tao (Pei-shan peninsula), which extends about $1\frac{1}{2}$ miles north-westward from South head. North flat, which dries, extends about 2 miles offshore on the northern side of the entrance. Ya tao (Ting-tsi), an islet 102 feet
40 (31^m1) high, lies on the northern side of the channel and nearly one mile northward of Outer cape.

There is good anchorage southward of Ya tao, in a depth of $4\frac{1}{2}$ fathoms (8^m2).

Middle cape (*Lat.* $36^{\circ} 34' N.$, *Long.* $120^{\circ} 55' E.$) lies nearly 2 miles
45 west-north-westward of Outer cape. Double rock lies on the northern side of the channel about 4 miles above Ya tao. South island, Ma-ku tao (North island), and Sunday island are situated in the inner part of the inlet; Inner cape is the northern point of South island.

Coast.—**Dangers.**—The coast between the northern entrance point
50 of Ting-tzu chiang and Lao-lung t'ou (Low point), the extremity of a promontory situated about 19 miles east-north-eastward, is low, sandy, and broken in places by rocky ledges. One of these ledges lies about 5 miles north-eastward of the northern entrance point of Ting-tzu chiang and about half a mile off this ledge is a reef which

Chart 3735.

dries 8 feet (2^m4) ; Huang shan (Flat hill) a flat-topped hill 796 feet (242^m6) high, is situated about 3 miles north-north-westward of this ledge.

Hai-yang is a walled city situated about half a mile within a projecting point about 6 miles westward of Lao-lung t'ou, and partly on the southern slope of a hill 399 feet (121^m6) high ; a rocky ledge, the outer part of which is sunken, extends about 1½ miles southward from this point. An irregular range of hills extends about 7 miles northward from Hai-yang and then turns eastward. Further northward is a range of mountains, the highest peak of which is the prominent dome-shaped Yü-huang ting (Lung shan), 1,864 feet (568^m1) high, situated about 10 miles north-eastward of Hai-yang ; from Yü-huang ting the range continues south-eastward to the coast.

Between Hai-yang and Lao-lung t'ou is a bight with sandy shores, from which two rocky ledges extend for a short distance ; rocky ledges also extend as much as three-quarters of a mile from Lao-lung t'ou.

Ju-shan k'ou (Zhu-shan kau), entered between Lao-lung-t'ou and a headland, 666 feet (203^m0) high, situated about 3½ miles north-eastward, has depths of 2½ fathoms (4^m6) at the entrance, decreasing gradually towards the shores of the bay.

Ta-ho k'ou.—Islands and dangers.—Depths.—Tidal streams.—The headland on the north-eastern side of Ju-shan k'ou lies on the western side of the entrance to Ta-ho k'ou (inlet). On the eastern side of the entrance are the two Central islands, joined together by a sandbank, and lying about 2 miles south-eastward of the headland ; the northern island is connected to the eastern entrance point of the inlet by a spit which dries. A rock awash lies about 3 cables eastward of the northern island. The southern island is 141 feet (43^m0) high.

The shores of Ta-ho k'ou are hilly ; the western entrance point is 145 feet (44^m2) high and steep-to. Nearly one mile eastward of the eastern entrance point is a tusk-shaped hill 702 feet (214^m0) high, and about 1½ miles further eastward is a sharp summit 598 feet (182^m3) high.

A least depth of 2 fathoms (3^m7) can be carried through the approach to Ta-ho k'ou ; in the entrance, which is about 3 cables wide the depths increase suddenly to from 4 to 9 fathoms (7^m3 to 16^m5). A rock, 10 feet (3^m0) high, lies about half a mile within the entrance ; the inlet then runs north-eastward, and has depths of from 3 to 5 fathoms (5^m5 to 9^m1) for about 1½ miles, after which it becomes shallow. The rate of the tidal streams at the entrance and within the inlet is reported to be considerable at spring tides.

Coast.—Islands.—Ta-chu tao (Arthur head), situated about 2½ miles eastward of the southern Central island (*Lat.* 36° 44' N. *Long.* 121° 29' E.), is an island connected to the main coast by a flat which dries ; its southern side is bold and cliffy, and on its western part is a sharp conical summit 416 feet (126^m8) high. An islet, about 150 feet (45^m7) high lies close off its western extremity.

Between the eastern end of Ta-chu tao and a point situated about 1½ miles eastward is the entrance to a bay, almost entirely occupied by flats which dry, leaving only a small basin, with depths of from 3 feet to 2 fathoms (0^m9 to 3^m7) ; rocky ledges extend from both entrance points, leaving a passage only about one cable wide between them. Mien-hua tao, 120 feet (36^m6) high, lies about half a mile southward of the eastern entrance point. Mao-erh (Bamba) shan, a hill, 427 feet

Charts 1255, 1256, 3480, 1262.

Chart 3735.

(130^m1) high, with a small temple on its summit, is situated about 1½ miles northward of the head of the bay.

Chart 3554.

- 6 Niao-tsui t'ou (Tau-tsui head), situated about 2 miles eastward of the eastern entrance point of the bay just described, is the south-eastern extremity of a bold, hilly peninsula, connected to the mainland by a sandy isthmus. Fung-wha shan, the highest hill on the peninsula, is 379 feet (115^m5) high, and has a large mound on its summit.
- 10 Huang tao (Chu-tan) is an island, 174 feet (53^m0) high, lying nearly half a mile off the southern coast of the peninsula, to which it is connected by a sandbank.

Off-lying rocks.—Hwei-tan, a rock 24 feet (7^m3) high, lies about 3¼ miles southward of Niao-tsui t'ou; a rocky ledge extends about 15 one cable south-eastward from it. A rock, which dries one foot (0^m3), lies about half a mile north-eastward of Hwei-tan.

- Lang-nuan k'ou.**—**Islands and dangers.**—**Anchorage.**—Lang-nuan k'ou (Poh-wang-tan) is entered between Niao-tsui t'ou and Kung-chia tao (Kung-kia tau), situated about 5 miles north-eastward. The shore 20 of the bay is steep for about 2 miles northward of Niao-tsui t'ou, and then becomes low, with a few rocky points in the southern part. At the head of the bay is a lagoon which nearly dries. Yau tao (tau) is a wedge-shaped islet, 44 feet (13^m4) high, lying about one mile southward of the narrow entrance to the lagoon; rocky ledges extend from 25 the shore westward of this islet.

Kung-chia tao is 48 feet (14^m6) high and lies on a reef extending nearly 2 miles southward from the shore; a rock awash lies about a quarter of a mile off the southern extremity of this reef.

- The bay affords good shelter for small vessels from northerly and 30 westerly winds, but the bottom is soft mud, and is not good holding ground. North-easterly winds send a nasty sea into the bay, except where sheltered by Kung-chia tao.

- Coast.**—**Islets and dangers.**—Shuan-lü chiao (Phoenix point) (*Lat.* 36° 51' N., *Long.* 121° 45' E.) is situated about 3 miles north- 35 eastward of Kung-chia tao, and about midway between is a cliffy point from which rocky ledges extend nearly half a mile. About half a mile northward of Shuan-lü chiao is the village of Hou-ch'ing-tung (Ho-shang-tung). Close northward of this village is a slight indentation in the coast known as Cochran landing, which is much 40 encumbered by reefs, some of which dry, extending up to one mile off-shore; it is a convenient and sheltered landing place, even with on-shore winds.

- The coast between Cochran landing and Goose point, a low sandy point nearly 12 miles east-north-eastward, is low and sandy. Tsuan 45 (Nai-nai) shan is a prominent summit, 1,297 feet (395^m3) high, lying about 2 miles north-westward of Cochran landing. Eastward of Tsuan shan the hills recede some miles inland, leaving an extensive plain through which a river, only navigable by sampans, flows and enters the sea about 3½ miles north-eastward of Cochran landing. 50 Several reefs lie within a distance of one mile off the entrance to this river, the entrance to which is called Yang-ts'un k'ou. Another river flows out about 6 miles north-eastward of Cochran landing, and a reef, which dries 8 feet (2^m4), lies nearly 2½ miles eastward of its mouth and about 1½ miles offshore.

Charts 1255, 1256, 3480, 1262.



Ch'a shan.

Southern coast of Shan-tung pan-tao (peninsula).
(*Original prior to 1880*).

*Su-men tao (Shan-tung I.),
bearing 167°, 6 miles.*

Chart 3554.

Wu-lei-tao wan (Mud Flat bay) entered between Goose point and Red Cliff point, situated about 5 miles south-eastward, practically dries throughout. Red Cliff point is a rock, 115 feet (35^m0) high, with steep reddish cliffs lying on the extremity of a narrow sandy spit; another rock, 90 feet (27^m4) high, lies on this spit. Red islets consist of several rocks or islets surrounded by reefs; the outer rock is 40 feet (12^m2) high and lies nearly 1½ miles south-south-westward of Red Cliff point; about 3 cables northward of this rock, and connected to it by a reef, is an islet 107 feet (32^m6) high, named Ku-sao tao. The easternmost islet, a sharp pinnacle rock 60 feet (18^m3) high, lies about 6 cables south-eastward of Red Cliff point; about 3 cables westward of this rock is an islet, 116 feet (35^m3) high, named Erh tao. Gribble rock, with a depth of 1½ fathoms (2^m7) over it, lies about 2½ miles south-westward of Red Cliff point.

Ching-hai wan.—**Depths.**—**Anchorage.**—**Tidal streams.**—Ching-hai wan (bay), situated between Red Cliff point and Ching-hai chiao (point), situated about 7 miles east-south-eastward, has general depths of from 1½ to 2½ fathoms (2^m3 to 5^m0), except at the head, which is very shallow. The shores of the bay are low, and are indented by several creeks which dry.

Ching-hai chiao is clifty and 40 feet (12^m2) high; Feng-huang-wei (Low island), 60 feet (18^m3) high, lies on a rocky ledge which extends about 6 cables south-westward from the point. The walled city of Ching-hai-wei is situated close within the point, but it is reported that the walls are practically in ruins; there is a conspicuous temple close northward of the city.

Chang-fou k'ou (Lockhart inlet) penetrates the land in a northerly direction at the head of the bay; it appears capacious at high water, but the navigable channel, between steep banks of mud and sand which dry, is only about 2 cables wide. There are depths of from 3½ to 5½ fathoms (6^m4 to 10^m1) in the fairway up to a distance of about 4 miles within the entrance, where the inlet turns eastward for about one mile, with depths of about 2 fathoms (3^m7), and then opens out into a wide basin mostly filled by flats which dry. The entrance to the inlet is obstructed by a bar of hard sand and mud, with a least depth of 5 feet (1^m5).

Small craft can obtain temporary anchorage westward of Ching-hai chiao (*Lat.* 36° 51' N., *Long.* 122° 11' E.), in depths of from 1½ to 2½ fathoms (2^m7 to 5^m0), sheltered from easterly winds; this anchorage, however, is not recommended, as, should the wind veer to southward, a heavy sea sets in, especially during the south-going stream. The tidal streams set round Ching-hai chiao into and out of the bay, and may attain a rate of 2 knots.

Coast.—**Dangers.**—The coast between Ching-hai chiao and South cape, situated about 8 miles eastward, is alternately low and clifty and is fringed by reefs in places. Cupola hill, 402 feet (122^m5) high, lies near the coast about 2½ miles eastward of Ching-hai chiao. Ch'a shan, a sharp peak, 1,750 feet (533^m4) high, surmounted by a small joss-house, is situated about 5 miles eastward of Ching-hai chiao and about one mile inland. From this peak a rugged range of mountains extends eastward to the western entrance point of Wang-chia wan (Wangkia bay), described on page 422; Ma-t'ou shan (hill), 955 feet (291^m1) high, is the eastern peak of this range. See view facing this page.

Charts 1255, 1256, 3480, 1262.

Chart 3554.

A shoal, with a least depth of $2\frac{1}{2}$ fathoms (5^m0) over it, lies about one mile south-eastward of Ching-hai chiao and from a half to one mile offshore. Stanley point is situated about 5 miles eastward of Ching-hai chiao, and two rocks, 2 and 3 feet (0^m6 and 0^m9) high, respectively, lie about 2 cables south-westward of Stanley point; an islet 41 feet (12^m5) high, lies about 4 cables east-south-eastward of this point.

Immediately westward of South cape is a small bay, where landing can be effected with southerly winds; a reef extends about 3 cables south-eastward from the western entrance point of this bay, and near its outer end is an islet, 10 feet (3^m0) high. Foul ground extends about a quarter of a mile southward from South cape.

Off-lying island and rocks.—Su-men tao (Staunton island) is situated about 6 miles south-westward of South cape, and rises to an elevation of 366 feet (111^m6) in its south-eastern part. In 1904 there was a fishing village with a landing place on the north-eastern side of the island, and another on the south-western side, but they were only occupied during the spring. An islet lies close off the north-western point, and another islet lies off the south-western point. A third islet lies off the south-eastern point of Su-men tao and is practically connected to it; a rock, with a depth of less than 6 feet (1^m8) over it, lies about $1\frac{1}{2}$ cables southward of this islet, and a 4-fathom (7^m3) patch lies about one cable south-westward of this rock.

South Channel rock, 68 feet (20^m7) high, lies about one mile north-westward of the north-western point of Su-men tao; a sunken rock lies about half a cable southward, and a rock, with a depth of less than 6 feet (1^m8) over it, lies about 2 cables north-north eastward of South Channel rock (*Lat. $36^\circ 46' N.$, Long. $122^\circ 14' E.$*).

North Channel rock, 86 feet (26^m2) high, lies about three-quarters of a mile northward of South Channel rock, and is the highest of a group of rocks; foul ground extends about 2 cables southward from these rocks, and a rock, with a depth of less than 6 feet (1^m8) over it, lies about 2 cables northward of them.

Witch rock, situated about 3 miles eastward of North Channel rock, has a depth of $1\frac{1}{2}$ fathoms (2^m7) over it and is steep-to, with depths of from 9 to 10 fathoms (16^m5 to 18^m3) around; it breaks heavily.

Fishing nets.—From November to June inclusive, fishing nets are laid out for a distance of 5 miles from the land in this locality. They are floating bag nets with a framework of spars, some of which are of considerable size, moored to the bottom in rows, sometimes half a mile in length, and when the tidal streams are strong they are not visible.

Tidal streams.—Off the southern coast of the Shan-tung pan-tao the tidal stream sets westward with the rising tide, and eastward with the falling tide. During the west-going stream there is a considerable indraught into all the bays westward of Ching-hai chiao. The west-going stream attains a general rate of $1\frac{1}{2}$ knots, and the east-going stream $1\frac{1}{2}$ knots; both streams are affected by the winds.

Chart 3468, plan of Wangkia bay.

Wang-chia wan.—**Islands and dangers.**—**Anchorage.**—Ma-t'ou tsui, the western entrance point of Wang-chia wan (Wangkia bay) lies about 2 miles north-eastward of South cape, and on it is the village of Ma-t'ou (Lau-shih-tao). Wang-chia tao (Wangkia islands), consisting of two islands joined together by a drying reef, is separated

Charts 3491, 1255, 1256, 3480, 1262, 2347.

Chart 3468, plan of Wangchia bay.

from Ma-t'ou tsui by a boat channel ; the eastern island is 147 feet (44^m8) high, and the western 90 feet (27^m4) high. The eastern entrance point of the bay is situated nearly one mile north-eastward of the eastern island of Wang-chia tao, and has a hill on it 466 feet (142^m0) high. 5

The western shore of Wang-chia wan is a long sandy beach, and immediately northward of the western entrance point is a lagoon which dries. The northern shore is steep and rocky, with reefs extending about one cable in places. T'u-pu (Dau) shan (*Lat. 36° 53' N., Long. 122° 23' E.*) is a flat summit, 1352 feet (412^m1) high, about one mile northward of the northern shore of the bay. 10

An islet, 30 feet (9^m1) high and connected to the coast by a reef, lies about one mile eastward of the eastern entrance point of Wang-chia wan. Bedwell rock, with a depth of 1½ fathoms (2^m3) over it, lies about 3½ cables southward of this islet. Blakeney rocks lie about half a mile westward of Bedwell rock ; the outer rock lies about a quarter of a mile offshore and dries 7 feet (2^m1). 15

The best anchorages in Wang-chia wan are northward of the eastern island of Wang-chia tao, in a depth of 3½ fathoms (6^m4), and northward of the western island, in a depth of 2 fathoms (3^m7). 20

Chart 3299.

Shih-tao wan.—Dangers.—Anchorage.—The western entrance point of Shih-tao wan (Shitau bay) is a rocky point situated about one mile north-eastward of the 30-foot (9^m1) high islet previously mentioned ; reefs extend about 2 cables south-eastward from this point, and terminate in a rock which dries 6 feet (1^m8). Dausi tau, the eastern entrance point, is situated about 2½ miles east-north-eastward of the western entrance point, and is the south-western extremity of Mu-yeh tao, an island connected to the mainland by a sand flat. 30 Dausi tau is a bluff headland 97 feet (29^m6) high, connected to Mu-yeh tao by a low neck ; the headland is fringed by reefs extending as much as 2 cables offshore. Pinnacle rock, 40 feet (12^m2) high, lies about 1½ cables off the southern extremity of the headland, and Outer rock, 12 feet (3^m7) high, lies nearly 3 cables east-south-eastward, of this 35 extremity.

On the western side of the bay, and about half a mile north-north-westward of the western entrance point, is a rocky headland named Pauti, from which foul ground extends about a quarter of a mile northward. The town of Shih-tao (Shitau) is situated about half a mile westward of Pauti ; Ch'ih (Si) shan is a prominent peak, 1,214 feet (370^m0) high, lying about 1½ miles north-westward of the town. Chisai rock, which dries one foot (0^m3), lies about one mile northward of Pauti and half a mile offshore. 40

The northern shore of the bay is mostly rocky, and rises about three-quarters of a mile inland to Sharp peak, a rugged hill, 846 feet (258^m5) high, at the southern extremity of a range rising to its greatest elevation in Chia-tzu-chan (Temple Saddle), 869 feet (264^m9) high, situated about 2 miles northward of Sharp peak. The northern shore is fringed by reefs ; Oyster rock, 4 feet (1^m2) high, lies on the southern extremity of a detached reef and about 1½ miles south-south-eastward of Sharp peak. Sharp peak in line with Oyster rock, bearing 338°, leads into the bay clear of the reefs extending from Dausi tau (*Lat. 36° 54' N. Long. 122° 29' E.*). 50

Charts 3491, 3554, 1255, 1256, 3480, 1262, 2347.

Chart 3299.

Small vessels can anchor about three-quarters of a mile north-eastward of the town of Shih-tao, in depths of from 21 to 22 feet (6^m₄ to 6^m₇), and also in the eastern part of the bay in the same depths, about 3 cables north-westward of Dausi tau. The bay affords good shelter with northerly winds, and the depths decrease gradually towards the head. Anchorage can be obtained south-westward of and outside the entrance to the bay in depths of from 8 to 10 fathoms (14^m₆ to 18^m₃), from one to 2½ miles offshore.

10 **Mu-yeh tao.—Dangers.—Light.—Fog signal.—Beacon.—Anchor-
age.**—Mu-yeh-tao (Mu-i tau) is a low island, and its coasts for the greater part consist of low cliffs fringed by reefs. The island is connected to the mainland northward by a drying bank, and is separated from the mainland at high water by a narrow channel,
15 named Wong-ko. Nan-tung kao-chiao, the south-eastern extremity of the island, is a headland 26 feet (7^m₉) high, from which a reef extends about 1½ cables; a detached reef, which dries 2½ feet (0^m₇), lies about 3 cables south-westward of the headland. Iltis cemetery, where the bodies of the captain and some of the crew of the German
20 gunboat *Iltis*, which was wrecked off Ch'u-tao tsui (page 425) in 1896, is situated on this headland; it is a small oasis of trees and greenery in an otherwise barren land.

There is a pier on the western side of Nan-tung kao-chiao, where boats can land, except near low water; a black beacon surmounted
25 by a cylinder, 8 feet (2^m₄) in height, marks the outer end of the pier.

A light is exhibited, at an elevation of 96 feet (29^m₃) from a circular tower, 77 feet (23^m₅) in height, painted red and white in horizontal bands, on Nan-tung kao-chiao; the keepers' dwelling is white.
30 A fog signal is sounded from the lighthouse.

Dautung t'ou (Dau-dung tau) (*Lat. 36° 55' N., Long. 122° 32' E.*), the eastern point of the island, is low and sandy; a reef extends about half a mile eastward from the point, and near the outer extremity of the reef is Lau-diau, consisting of two rocks, one of which is 8 feet
35 (2^m₄) high. A reef, which dries one foot (0^m₃), lies about 6 cables north-eastward of Dautung t'ou, and a rock, with a depth of 8 feet (2^m₄) over it, lies about the same distance north-eastward of the point.

Schwilp patches, with a least depth of 21 feet (6^m₄) over them, lie between three-quarters of a mile and one mile east-south-eastward of
40 Dautung t'ou.

There is anchorage for large vessels, during northerly or north-westerly winds, off the southern coast of Mu-yeh tao, in a depth of 36 feet (11^m₀), with the lighthouse on Nan-tung kao-chiao bearing 041°, distant 6½ cables; small craft can anchor about 1½ cables
45 north-westward of the detached reef lying south-westward of the lighthouse, in a depth of 24 feet (7^m₃).

Chart 1255.

COAST.—Mu-yeh tao to Wei-hai-wei.—General remarks.—From Mu-yeh tao the coast trends generally northward for a little more than
50 30 miles to Ch'eng-shan t'ou (North-east promontory), and then turns abruptly westward for about 22 miles to the entrance to Wei-hai-wei chiang (harbour). This section of the coast is generally hilly, and its eastern side is indented by numerous bays.

Charts 3491, 3554, 1256, 3480, 1262, 2347.

Chart 1255.

Outlying shoals.—A shoal, with a depth of $5\frac{1}{2}$ fathoms (10^m1) over it, was reported, in 1927, to exist at a distance of about $19\frac{1}{2}$ miles south-eastward of Nan-tung kao-chiao; this shoal has been searched for without success.

A shoal, with a depth of 5 fathoms (9^m1) over it, was reported by H.M.S. *Argus*, in 1928, at a distance of about 26 miles east-north-eastward of Nan-tung kao-chiao.

Charts 3299, 3491.

Coast.—Dangers.—Anchorage.—Tidal streams.—The coast between Dautung t'ou and Ch'u-tao tsui, situated about $7\frac{1}{2}$ miles northward, is low. Erh shih (Ears rock), lying about 3 miles north-north-eastward of Dautung t'ou and $1\frac{1}{2}$ miles offshore, is 57 feet (17^m4) high, and from some directions has the appearance of an ass's ears; reefs extend as much as a quarter of a mile around the rock, and the passage between it and the coast westward is foul. A rock, 8 feet (2^m4) high, lies about 8 cables northward of Erh shih, with depths of less than 5 fathoms (9^m1) between. The bay which is entered between Dautung t'ou and Erh shih is clear, and affords anchorage in depths of from 4 to 8 fathoms (7^m3 to 14^m6).

Chart 3491.

Ch'u-tao tsui is the eastern extremity of Ch'u tao, an island connected to the mainland by a sandbank, a small portion of which covers at high water; the village of Ch'u-tao is situated on the western part of the island, and there are two joss-houses on the southern side. Reefs, with rocks above water and sunken rocks, extend about 6 cables southward, 3 cables eastward, and one mile northward from Ch'u-tao tsui. An isolated 5-fathom (9^m1) patch, lies about $1\frac{1}{2}$ miles south-south-eastward of Ch'u-tao tsui. Four Fathom patch, situated nearly $1\frac{1}{2}$ miles north-eastward of Ch'u-tao tsui has a rocky bottom; a 5-fathom (9^m1) patch lies nearly midway between this patch and the shore south-westward.

The north-going stream off Ch'u-tao tsui runs from about $4\frac{1}{2}$ hours after high water at Wei-hai-wei (Admiralty Tide Tables Standard Port) until about 2 hours before the next high water there, and the south-going stream from about 2 hours before until $4\frac{1}{2}$ hours after high water.

Out-lying shoal.—A shoal, with a depth of $5\frac{1}{2}$ fathoms (10^m5) over it, lies about $5\frac{1}{2}$ miles east-south-eastward of Ch'u-tao tsui; its position is approximate.

Sang-kou wan.—Dangers.—Anchorage.—Directions.—Sang-kou wan (Sangkau bay), entered between Ch'u-tao tsui and a point situated about $6\frac{1}{2}$ miles northward, has general depths of from 6 to 8 fathoms (11^m0 to 14^m6) in the entrance, decreasing gradually towards the shore. The southern shore of the bay is low, except for Ku (Lauma) shan (*Lat.* $37^\circ 01' N.$, *Long.* $122^\circ 27' E.$), a steep, rugged hill, 347 feet (105^m8) high, situated at the western end. A reef, which dries 3 feet (0^m9), lies about $1\frac{1}{2}$ miles westward of Ch'u-tao tsui. Lung-munn Chiang is an inlet in the south-western corner of the bay, but the greater part of it dries. Hua-pan (Falang) shih, lying about $1\frac{3}{4}$ miles north-north-eastward of Ku shan is a mass of large boulders, 49 feet (14^m9) high; above water and sunken rocks lie within a distance of 3 cables south-westward of it.

The western shore is also low, but about $3\frac{1}{2}$ miles north-westward

Charts 3554, 1256, 3480, 1262, 2347.

Chart 3491.

- of Hua-pan shih and $1\frac{1}{2}$ miles inland is Lao shan, a steep, rugged hill, 545 feet (166^m1) high. The southern part of this shore is fringed by reefs and rocks. Poko tao is a reef, which dries, lying with its southern extremity about half a mile northward of Hua-pan shih, and there is a rock on it 2 feet (0^m6) high. A rock, on which the *Hino maru*, with a draught of 18 feet (5^m5), is stated to have struck in 1907, is reported to lie about 3 miles northward of Hua-pan shih and $1\frac{1}{2}$ miles offshore, but its position is doubtful. Westward of the reported position of this rock is the entrance to a large lagoon, the greater part of which dries; the entrance is fronted by sandbanks, and close north-eastward of it are some rocks 10 feet (3^m0) high. This lagoon is enclosed by a low sandy peninsula, about 3 miles long, named Lu-tu (Liito) tao.
- The northern shore consists of cliffs from 80 to 100 feet (24^m4 to 30^m5) high. Village hill, 254 feet (77^m4) high, is situated about three-quarters of a mile within the western part of this shore. A reef, with a least depth of $1\frac{1}{2}$ fathoms (2^m3) over it, lies southward of this hill and about one mile offshore; there is foul ground north-north-westward of this reef. Numerous rocks lie within 2 cables of the northern shore of the bay, and reefs and rocks extend about 3 cables eastward from the northern entrance point; Alexander patch, with a depth of $4\frac{3}{4}$ fathoms (8^m7) over it, lies nearly one mile southward of the northern entrance point.
- Sang-kou wan affords shelter to small vessels except with easterly winds; with these winds, however, vessels can anchor about three-quarters of a mile north-westward of Ch'u-tao village, in a depth of 4 fathoms (7^m3), somewhat protected by the reef extending northward from Ch'u-tao tsui. When approaching this anchorage, Hua-pan shih may be steered for bearing 255°, which leads about half a mile northward of Four Fathom patch and the shoals extending northward from Ch'u-tao tsui.

Chart 3468, plan of Aylen bay.

- Ai-lun wan.—Dangers.—Anchorage.**—Shu-ya t'ou (Haimaotzu tau) is a cliffy point situated about three-quarters of a mile northward of the northern entrance point of Sang-kou wan, and the coast between is fringed by reefs and rocks extending as much as a quarter of a mile offshore; Sphinx rock, 20 feet (6^m1) high, lies about 2 cables offshore midway between these two points.
- Ai-lun wan (Aylen bay) is entered between Shu-ya t'ou and Ma-ta chiao (Tutzushih point), situated nearly 3 miles north-eastward; there are depths of from $5\frac{3}{4}$ to 8 fathoms (10^m5 to 14^m6) in the entrance, decreasing gradually towards the head of the bay. In 1923, the *Eian maru*, with a draught of about 9 feet (2^m7), reported grounding on a shoal situated about 7 cables southward of Ma-ta chiao.

Chung chiao (Middle point), a rocky headland, divides Ai-lun wan into two parts, each of which affords fair anchorage with north-easterly winds; Chung chiao is fringed by rocks and shoals within a distance of 2 cables. Small vessels can anchor northward of Shuatau hummock, situated about 4 cables north-westward of Shu-ya t'ou, in a depth of about $3\frac{1}{2}$ fathoms (6^m4), and also westward of Chung chiao.

Ma-ta chiao (*Lat.* 37° 12' N., *Long.* 122° 37' E.) is a flat, rocky headland, 30 feet (9^m1) high, joined to the mainland by a narrow neck;

Charts 1255, 1256, 3480, 1262, 2347.

Chart 3468, plan of Aylen bay.

it is surrounded up to a distance of 2 cables by reef and rocks. There is a joss-house on the inner end of the headland. About 4 cables northward of Ma-ta chiao is a point 50 feet (15^m2) high, from which shoal water extends about 4 cables north-eastward; there is usually a heavy tide-race off this point. 5

Chart 3491.

Coast.—Dangers.—The coast between Ma-ta chiao and Watao shih, situated about 3 miles north-north-westward, is low, with cliffs 50 feet (15^m2) high in places, and is fringed by reefs, which extend about 3 cables north-eastward from Watao shih; a rock, 6 feet (1^m8) high, lies about 3 cables eastward of this point, and a 1½-fathom (2^m3) patch lies close southward of this rock.

Chart 3468, plan of Litau bay.

Li-tao wan.—Islands and dangers.—Anchorage.—Li-tao (Litau) shan, 329 feet (100^m3) high, is a steep hill situated about three-quarters of a mile north-westward of Watao shih. A reef, which dries, extends nearly three-quarters of a mile northward from the coast at the foot of this hill, and on this reef are the two Gravel islands; North Gravel island, 128 feet (39^m0) high, has reddish cliffs on its northern and eastern sides, and some rocks above water lie close off its north-eastern point. South Gravel island is 108 feet (32^m9) high. 15 20

Chart 3491.

The Thumb (*Lat.* 37° 16' N., *Long.* 122° 30' E.), a peak, 954 feet (290^m8) high, shaped like a thumb, is situated about 2½ miles westward of the head of Li-tao wan, and from it a range extends westward; on this range, and about 2½ miles westward of The Thumb, is a sharp shoulder, 1,683 feet (513^m0) high, and nearly 1½ miles further westward is Mount Wade, 1,800 feet (548^m6) high, with a flattish top. 25 30

Chart 3468, plan of Litau bay.

Li-tao wan (Litau bay) is entered between North Gravel island and Hei shih, a reef with two rocks on it, 3 and 4 feet (0^m9 and 1^m2) high, respectively, about 9 cables northward; there are depths of less than 3 fathoms (5^m5) for 3 cables eastward and westward of Hei shih. 35

Pigeon point lies on the southern side of the bay about three-quarters of a mile westward of North Gravel island.

Green island lies on a reef which extends about 4 cables from a point on the north-western side of the bay and about 8 cables westward of Hei shih; a rock, 6 feet (1^m8) high, lies about 1½ cables southward of Green island. 40

Li-tao wan is open to north-easterly winds, but is sheltered from south-eastward by Gravel islands; numerous junks usually lie here. The best anchorage for small vessels is on the southern side of the bay, in a depth of about 3½ fathoms (6^m4), with the southern point of North Gravel island bearing 100°, distant 2½ cables. This anchorage is off the small town of Li-tao (Litau), which has considerable coasting trade. 45

Charts 3491, 3457.

Coast.—Dangers.—Linglo-tan is a bay which is entered between Hei shih and Ku t'o, a steep, narrow headland about one mile north-north-westward, on which is a rocky summit 209 feet (63^m7) high; a small islet, 25 feet (7^m6) high, lies close off Ku t'o, and there are several rocks within one cable of this headland. The bay is divided into 50

Charts 1255, 1256, 3480, 1262, 2347.

Charts 3491, 3457.

two parts by a point in the north-western portion, from which a spit, with an island 30 feet (9^m1) high on it, extends fully half a mile south-eastward; Cole rocks, with depths of less than 6 feet (1^m8) over them, lie about 2 cables south-eastward of the island. Owing to the rocky nature of the bottom, the bay is not recommended as an anchorage.

The coast between Ku t'o and Stevens point, situated about three-quarters of a mile northward, is indented by a few small bights and is fringed by rocky ground.

10 *Chart 3468, plan of Yangyuchih bay.*

Yang-yu-chih wan.—**Island and dangers.**—**Anchorage.**—**Directions.**

—Yang-yu-chih wan (bay) is entered between Stevens point and Chiao tao, which lies about midway between this point and a point, with a joss-house on it, lying nearly three-quarters of a mile north-eastward. Chiao tao (*Lat. 37° 19' N., Long. 122° 34' E.*) is a flattish green island, 77 feet (23^m5) high, and between it and the northern shore of the bay there is foul ground, over which boats can only pass at high water. A sand spit, which dries, extends nearly 2 cables north-westward from the northern side of the island and terminates in Gull rock, which dries 4½ feet (1^m4); reefs extend about one cable from the south-eastern extremity of the island. Gibson rock, with a depth of 1½ fathoms (3^m2) over it, lies about 3 cables south-eastward of Chiao tao. A rock, which dries 2 feet (0^m6), lies nearly one cable north-eastward of Stevens point.

25 Tungyung shan, with a conspicuous joss-house on it, rises to an elevation of about 100 feet (30^m5) on the southern side of the bay and about half a mile north-westward of Stevens point. Direction point is situated about 6 cables northward of the joss-house just mentioned, and from a short distance above this point the bay dries completely.

The bay should be entered with Direction point bearing 322°, and just open south-westward of Chiao tao; thence pass about one cable south-westward of the island, and anchor about 2 cables westward of its south-western point in a depth of 3½ fathoms (6^m4). A vessel approaching from northward should keep Mount Stanley (page 429) bearing not more than 027°, and open eastward of Ma-shan chiao (to) (*see below*), so as to pass eastward of Gibson rock. South-easterly winds send a nasty sea into the bay.

Charts 3468, plan of Yangyuchih bay; 3457, 3491.

40 **Coast.**—**Off-lying rocks.**—The coast between the northern entrance point of Yang-yu-chih wan and Ma-shan chiao, situated about 1½ miles north-eastward, is steep, rocky and fringed by reefs. Ma-shan chiao (to) is the extremity of a steep, rocky peninsula 240 feet (73^m1) high; a pinnacle rock, 25 feet (7^m6) high, lies close off the point, and a rock, 12 feet (3^m7) high, lies about 2 cables eastward of the point. Kua (Kwa) shih, situated about 7 cables eastward of Ma-shan chiao, is a rock 19 feet (5^m8) high; Ch'eng-shan-t'ou light (page 430) is obscured over this rock.

50 Ma shan, lying nearly one mile westward of Ma-shan chiao, is a prominent, smooth-topped, saddle-shaped hill, 473 feet (144^m2) high. Northward of Ma shan is a plain, which separates the high land of Shan-tung kao-chiao (promontory) from that of Shang-tung pan-tao.

Charts 3457, 3491.

Jung-ch'eng wan.—**Dangers.**—**Anchorage.**—**Jung-ch'eng wan**

Charts 1255, 1256, 3480, 1262, 2347.

Charts 3457, 3491.

(Yungching bay) is entered between Ma-shan chiao and Hei-tsui-tzu (Heitsuitze) (*Lat. 37° 23' N., Long. 122° 41' E.*), a point situated about $4\frac{1}{2}$ miles north-eastward; the north-western shore of the bay is sandy. 5

Mashan chiang, a lagoon within the south-western part of the bay, is separated from the sea by a narrow strip of sand; its entrance is about one mile north-westward of Ma-shan chiao. Jung-ch'eng (Yungching hsien) is a walled town situated on the sandy plain about three-quarters of a mile north-westward of Mashan chiang. 10

A low, rocky point, with a joss-house on it, is situated about $2\frac{3}{4}$ miles north-north-eastward of Ma-shan chiao; a rock, with a depth of 6 feet (1^m8) over it, lies about one cable south-eastward of this point.

Lung-hsü-tao k'ou (Dove cove), situated in the north-eastern part of Jung-ch'eng wan, is shallow, and rocks extend about $1\frac{1}{2}$ cables from its eastern shore. 15

Hei-tsui-tzu is the southern extremity of a promontory with two rugged hills on it, 308 and 391 feet (93^m9 and 119^m2) high, respectively; a rock, with a depth of $2\frac{1}{2}$ fathoms (4^m6) over it, lies about 2 cables south-westward of Hei-tsui-tzu, and a $4\frac{1}{2}$ -fathom (8^m2) patch lies about $1\frac{1}{2}$ cables further south-westward. 20

Jung-ch'eng wan affords shelter with winds from between south-west and north-east, through north, in depths of from 4 to 7 fathoms (7^m3 to 12^m8); small craft can obtain shelter from easterly winds in Lung-hsü-tao k'ou. Vessels bound for Po hai (Gulf of Pohai), encountering a north-westerly gale in this locality, can shelter in Jung-ch'eng wan until it has abated. 25

Chart 3457.

Shan-tung kao-chiao.—Shan-tung kao-chiao (promontory), forming the north-eastern part of Shan-tung pan-tao, mostly consists of a series of peaked hills, from 300 to 885 feet (91^m4 to 269^m7) high; these hills are separated from each other by deep valleys, and appear as islands from a distance south-eastward or north-westward. See view facing page 434. 35

Chung shan, the westernmost and highest hill, is situated about 4 miles west-north-westward of Hei tsui-tzu, and appears very pointed and precipitous from northward. Mount Stanley, 607 feet (185^m0) high, is situated about $2\frac{1}{4}$ miles north-westward of Hei tsui-tzu. 40

Charts 3457, 3491.

Coast.—Dangers.—Caution.—From Hei-tsui-tzu the coast trends about $1\frac{1}{4}$ miles north-eastward to Ch'eng-shan t'ou. About midway between Hei-tsui-tzu and Ch'eng-shan t'ou is a bay with a sandy beach, where stores for the lighthouse on Ch'eng-shan t'ou are landed during north-westerly winds; reefs extend about 2 cables from the northern shore of this bay. 45

Ch'eng-shan t'ou (North-east promontory) is a rugged and broken cliff, and rises about 4 cables westward to a conical hill 368 feet (112^m2) high, with a prominent red temple on its southern slope; Ch'eng-shan t'ou is steep-to. Wrecks in this locality have been numerous, as fog is frequent, and there is a dangerous tide-race half a mile offshore; in thick weather every opportunity should be taken to fix the vessel's position, and soundings should be taken constantly. 50

Charts 1255, 1256, 3480, 1262, 2347.

Charts 3457, 3491.

Light.—A light is exhibited, at an elevation of 211 feet (64^m3), on Ch'eng-shan t'ou.

Tidal streams.—Eastward of Ch'eng-shan t'ou, the tidal streams run northward from between 5 and 6 hours after high water at Wei-hai-wei (Admiralty Tide Tables Standard Port) until between one and 2 hours before the next high water there, and southward for the remaining period. The tidal streams attain a rate of 2½ knots about 1½ miles eastward of Ch'eng-shan t'ou, but they are influenced by the winds.

For the tidal streams at a position about 7 miles eastward of Ch'eng-shan t'ou, see note on tidal streams in position D on chart 3457. *Chart 3457.*

Coast.—Off-lying island and dangers.—Caution.—The coast between Ch'eng-shan t'ou and Bluff point (*Lat.* 37° 25' N., *Long.* 122° 40' E.), situated about 2½ miles north-westward is rocky and indented by small bays. A rocky patch, with a rock on it 10 feet (3^m0) high, lies about a quarter of a mile northward of Ch'eng-shan t'ou. About half a mile north-westward of Ch'eng-shan t'ou is a landing place, with steps cut in the rock, where stores for the lighthouse are landed during southerly winds.

Wohu shih, lying about three-quarters of a mile eastward of Bluff point and half a mile offshore, has a depth of one foot (0^m3) over it and breaks in a heavy sea.

Hai-lü tao (Alceste island), 211 feet (64^m3) high and situated about 1½ miles northward of Bluff point, is flat-topped and bordered by cliffs; some rocks, one of which is 2 feet (0^m6) high, lie within a distance of 3 cables north-eastward of the island. Kwa shih, a pinnacle rock 5 feet (1^m5) high, lies about a quarter of a mile southward of the eastern end of Hai-lü tao and a rock, which dries one foot (0^m3), lies about 1½ cables eastward of this pinnacle rock. A submerged obstruction was reported, in 1948, about half a mile south-south-eastward of the eastern end of Hai-lü tao.

Owing to the existence of the above dangers it is not advisable to use the channel southward of Hai-lü tao at night; the overfalls in the channel are very heavy at spring tides, and extend from Ch'eng-shan t'ou to about 2 miles westward of Hai-lü tao.

Tidal streams.—Northward of Hai-lü tao the tidal streams run north-westward from 6 hours after high water at Wei-hai-wei until about 2 hours before the next high water there, and south-eastward from about one hour before until 5 hours after high water at Wei-hai-wei. The tidal streams may attain a rate of from 1½ to 2 knots, but are affected by the winds. See also note on tidal streams in position C on chart 3457.

The tidal streams in the channel between Hai-lü tao and Shan-tung kao-chiao attain a rate of from 2½ to 3 knots. Overfalls, which are heavy at spring tides, extend from Shan-tung kao-chiao through this channel to a position about 2 miles westward of Hai-lü tao.

Chart 3468, plan of Malan and Lung-yen coves.

Ma-lan wan and Lung-yen wan.—Dangers.—Anchorage.—Ma-lan wan (cove) is entered between Bluff point and Kung-t'ung-hsia (Separation point), situated about half a mile westward; reefs, on which are some above-water rocks, extend nearly one cable northward and westward from Bluff point. Cliff point, situated at the

Charts 1255, 1256, 3480, 1262, 2347.

Chart 3468, plan of Malan and Lungyen coves.

head of the cove, is steep and cliffy ; a reef extends about one cable north-eastward from it. Ma-lan wan is a convenient anchorage for small vessels during southerly or easterly winds ; northerly and north-westerly gales send in a heavy sea. The best anchorage is 3 5 cables south-westward of Bluff point, in depths from from 5 to 5½ fathoms (9^m1 to 10^m5), tenacious mud.

Lung-yen wan (cove) is entered between Kung-t'ung-hsia and a point lying about 4 cables westward. Rocks extend about 2 cables from its eastern shore, and the cove does not afford the same amount 10 of shelter as Ma-lan wan.

Chart 3457.

Coast.—Dangers.—Off-lying island.—Tidal streams.—Hsia k'ou (kow), a cove situated about three-quarters of a mile westward of Lung-yen wan, is frequented by fishing boats. 15

The coast for about 2½ miles south-westward of the western entrance point of Hsia k'ou is rocky and indented, and reefs extend nearly 2 cables in places. Thence to Ch'ao-yang chiao (Chau-yang point), a low cliffy point situated about 4½ miles further westward, there is a sandy beach. Yung-ch'eng shan (Yungching sandhill) is situated 20 about three-quarters of a mile inland from the eastern end of this beach. The entrance to Ch'ao-yang (Chau-yang) lagoon, which nearly dries, lies about 1½ miles south-south-eastward of Ch'ao-yang chiao. Reefs and rocks, some of which are above water, extend about half a mile northward and north-westward from Ch'ao-yang chiao. 25

Chi-ming tao (*Lat. 37° 27' N., Long. 122° 29' E.*), situated about one mile northward of Ch'ao-yang chiao, is a flat-topped island, 245 feet (74^m7) high, fringed by reefs, which extend about a quarter of a mile from its western side. There are irregular depths of from 3 to 5 fathoms (5^m5 to 9^m1) in the channel between the reefs extending 30 from Chi-ming tao and those extending from Ch'ao-yang chiao. The west-going tidal stream in this channel attains a maximum rate of 2½ knots, and the east-going stream 1½ knots. In 1934 H.M.S. *Sandwich* passed through this channel during the strength of both the east-going and west-going streams, without experiencing difficulty from tide-rips and eddies. For the tidal streams northward of Chi-ming tao, 35 see note on tidal streams in position B on chart 3457.

Local magnetic anomaly.—In 1935, a local magnetic anomaly was reported about 1½ miles northward of Chi-ming tao, an increase of 4° westerly variation having been observed. In 1936, an increase of 40 about 5° westerly variation was observed in the same position.

Coast.—Dangers.—Nearly 1½ miles south-westward of Ch'ao-yang chiao is a cliffy point about 40 feet (12^m2) high ; there is a good landing place on the western side of this point, but the beach shelves rapidly. The coast for about 6½ miles westward of this point is sandy 45 and low, except for Hui-ting, a sandy headland, 143 feet (43^m6) high, situated about 5 miles westward of Ch'ao-yang chiao ; reefs, which dry, extend as much as 4 cables off this headland and off the coast for 2 miles westward. About 2½ miles westward of Hui-ting is the entrance to a small lagoon, and the coast then becomes rocky and broken as far as Trench cove, lying about 2 miles further westward. 50 Trench cove is small, and of no importance ; a rock, which dries 2 feet (0^m6), lies about a quarter of a mile off its eastern entrance point.

Charts 1255, 1256, 1262, 2347.

Chart 3457.

Yin-shan k'ou (bay), entered between the western entrance point of Trench cove and a point situated about $1\frac{1}{2}$ miles north-north-westward, affords good anchorage in a depth of 8 fathoms (14^m6), sheltered from winds from between south-west and north-west; a heavy swell sets in with north-easterly winds. Wu-chu ho and another river flow into the bay, and at the entrance to Wu-chu ho is a lagoon available for small junks at high water.

San-feng chiao (Three Peaked point), situated about half a mile northward of the northern entrance point of Yin-shan k'ou, is rocky; it has three peaked rocks at its foot, and a ledge of rocks, which is steep-to, extends about $1\frac{1}{2}$ cables from it. There are several rounded hills near the point, Beacon hill, 313 feet (95^m4) high, lying about 4 cables westward, being the highest and most prominent; Beacon point is situated at the foot of this hill and about 4 cables north-westward of San-feng chiao.

Chao-pei tsui is a bluff point situated about $1\frac{1}{2}$ miles westward of Beacon point, the coast between being cliffy and rugged; a rock, 10 feet (3^m0) high, lies on a reef which extends about half a cable from Chao-pei tsui.

Light.—A light is exhibited, at an elevation of 94 feet (28^m7), from a white circular iron tower, 35 feet (10^m7) in height, situated on Chao-pei tsui (*Lat. $37^{\circ} 28' N.$, Long. $122^{\circ} 14' E.$*); the keepers' dwelling is white.

WEI-HAI-WEI CHIANG.—**General remarks.**—Wei-hai-wei chiang (harbour) lies in a bay entered between Chao-pei tsui and Pei-shan tsui (point), situated about $5\frac{1}{2}$ miles north-westward, and is sheltered from seaward by Liu-kung tao, an island lying between the two entrance points; the anchorage is easy of access and affords shelter to a considerable number of vessels of moderate draught, but the area available for large vessels is restricted. There are two entrances, the eastern leads southward of Liu-kung tao, and the western leads north-westward of this island.

Wei-hai-wei was formerly leased to Great Britain and used as a naval base, but has been under Chinese control since 1940. The Port Commissioners office is in the northern outskirts of the town of Wei-hai-wei, which is situated on the mainland in the north-western end of the bay.

Depths.—**Caution.**—The depths in the harbour are generally between 3 and 5 fathoms (5^m5 and 9^m1), but depths of less than 3 fathoms (5^m5) extend about 7 cables southward from Liu-kung tao, and there are patches of similar depth midway between Liu-kung tao and the mainland south-westward. There is a small area of deeper water off the south-western end of Liu-kung tao, to which there is direct access through the deep western entrance, but cannot be reached from the eastern entrance without passing over depths of 20 feet (6^m1).

On exceptional occasions, during winter, the sea level may fall as much as $5\frac{1}{2}$ feet (1^m7) below the datum to which the soundings are reduced; this usually happens after strong north-westerly or northerly winds, and may be caused by increased atmospheric pressure.

Aspect.—There are three ranges of hills in the vicinity of Wei-hai-wei; the hill sides are either barren rock or are planted with dwarf

Chart 3457.

pine and scrub oak. The valleys are mostly undulating country intersected by gullies and mountain river beds; the streams are all torrential and choke up the valleys with sand and debris from the hills. For nine months of the year these river beds are dry. 5

Macdonald hills are a range of barren hills rising to a summit, 694 feet (211^m5) high, situated about 3½ miles south-westward of San-feng chia, and terminate westward in Macgregor valley.

Seymour range, at the head of the bay, is in the form of a crescent; the sides of the hills are much broken by ravines. Fo-ya ling (Mount Goschen), 1,343 feet (409^m3) high, (*Lat.* 37° 29' N., *Long.* 122° 05' E.), the principal peak, is situated about 4 miles south-westward of Pei-shan tsui. Fung-hwang shan, 1,353 feet (412^m4) high, and Li-ko shan, 1,365 feet (416^m0) high, are situated, respectively, about one mile south-westward and nearly one mile westward of Fo-ya ling. 15

Fitzgerald range, situated on the northern side of the bay, takes the form of a crescent; Mien-hua shan (Mount Richards), its highest peak, is 965 feet (294^m1) high and situated about 1½ miles west-north-westward of Pei-shan tsui.

Na-ku shan (Valley hill), situated about 1½ miles northward of 20 Fo-ya ling and at the back of the walled town of Wei-hai-wei, is 400 feet (121^m9) high and prominent; from this hill undulating slopes extend westward and form a low ridge between Seymour and Fitzgerald ranges. In the valleys on each side are several scattered villages, and the whole is cultivated. Nearly 3½ cables eastward of 25 the summit of Na-ku shan is a tower or joss-house, which was reported, in 1935, to be illuminated at night.

Liu-kung tao appears barren from seaward, but its slopes have been planted with trees. Centurion hill, 498 feet (151^m8) high, with a signal station on it, is the highest part, and from this hill ridges run 30 through the middle of the island.

Eastern entrance. — Coast. — Islet and dangers. — Beacon. — The eastern entrance lies between Liu-kung tao and the mainland southward. The coast between Chao-peï tsui (page 432) and Lung-miao tsui, situated about 2 miles south-westward, is indented by 35 two bays, Dorward bay and Ward bay; on Lu-chue tsui, the point between them, are the ruins of a fort. A reef extends about 2 cables from the coast close eastward of Lu-chue tsui, and terminates in a rock 4 feet (1^m2) high. Ward rocks, situated on the western side of Ward bay, extend nearly half a mile offshore, and the outer one 40 dries 2 feet (0^m6).

Jih (Zhi) tao (*Lat.* 37° 29' N., *Long.* 122° 12' E.) situated about 2 miles north-westward of Chao-peï tsui, is rocky, 41 feet (12^m5) high, and was formerly a fort; a beacon, consisting of a white cairn, stands on its northern side, but in 1939 it was reported that this beacon had 45 fallen down and was not conspicuous. Jih tao is surrounded by a reef, which partly dries, extending fully 1½ cables from its northern and southern sides. Davy rocks, situated about 1½ cables south-eastward of Jih tao, are awash and are not readily seen.

Hu-an-lok rocks lie on the northern side of the eastern entrance, 50 and extend about 5 cables east-south-eastward from the eastern extremity of Liu-kung tao. These rocks are above water and lie on reefs which dry; they are divided into two parts, separated by a channel with a least depth of 7 feet (2^m1).

Charts 1255, 1256, 1262.

Chart 3457.

Coast.—Danger.—Yang-chia wan (Yang-ka bay), entered between Lung-miao tsui and White Sandy point, situated about $2\frac{1}{4}$ miles westward, is free from dangers; White Sandy point is prominent
 5 owing to its beach of white sand, and a rocky ledge extends about 2 cables eastward from it. Macgregor valley, situated at the head of the bay, is flat, highly cultivated, and a few streams flow through it; there are some salt pans near the shore of the bay.

Chu-tao chiao (Flagstaff point), situated about $2\frac{1}{4}$ miles northward
 10 of White Sandy point, becomes an islet at high water; a rocky ledge, with some heads on it from one to 3 feet (0^m3 to 0^m9) high, extends about three-quarters of a cable from the point. About 3 cables south-westward of Chu-tao chiao is Chin-hsien ting (Flagstaff hill), a hill, 154 feet (46^m9) high, with a tower on its summit.

15 **Light.**—A light is exhibited, at an elevation of 53 feet (16^m2), from a white iron column, 24 feet (7^m3) in height, on Chu-tao chiao; there is a white dwelling near the light-structure.

Liu-kung tao.—Piers.—Beacons.—Buoys.—Among the buildings on the southern side of Liu-kung tao is the former Masonic hall,
 20 a prominent drab-coloured building with a dark roof. A signal station, painted white, with a flagstaff on its eastern side, is situated on the coast about 4 cables eastward of the south-western extremity of the island and is prominent. A square tower, situated about half a mile westward of the eastern extremity of the island, is prominent.
 25 East village is situated in the middle of the southern coast of the island.

There are several piers along the western part of the southern coast of Liu-kung tao. The easternmost of these is in ruins, and it is dangerous to approach in boats owing to large blocks of masonry lying
 30 submerged near it; a white stone beacon stands in the centre of the broadest part of this pier. A pier is situated about a quarter of a mile westward of the eastern pier; a beacon stands on its outer end.

Huang tao (Observatory island), 30 feet (9^m1) high, is connected by a causeway to the south-western extremity of Liu-kung tao; this
 35 causeway forms the northern side of a boat camber, which nearly dries.

Three can buoys mark the edge of shoal water extending from the south-western end of Liu-kung tao; No. 1 buoy is moored about three-quarters of a cable westward of Huang tao and is black;
 40 No. 2 buoy is moored about $1\frac{1}{2}$ cables westward of the entrance to the boat camber and is black and white chequered; No. 3 buoy is moored about $1\frac{1}{2}$ cables southward of the entrance to the boat camber and is black. A mooring buoy is moored about 2 cables south-south-eastward of the entrance to the boat camber.

45 Mandarin bay is on the north-eastern side of Liu kung tao. Gaunt islet, 15 feet (4^m6) high, lies about half a cable off Gaunt point, the north-western entrance point of the bay, and is rocky.

The northern coast of Liu-kung tao between Gaunt point and Kwoa-pu, a point situated about three-quarters of a mile west-north-westward, is indented with several coves. A pinnacle rock, with a
 50 depth of 18 feet (5^m5) over it, lies close off the western side of Kwoa-pu.

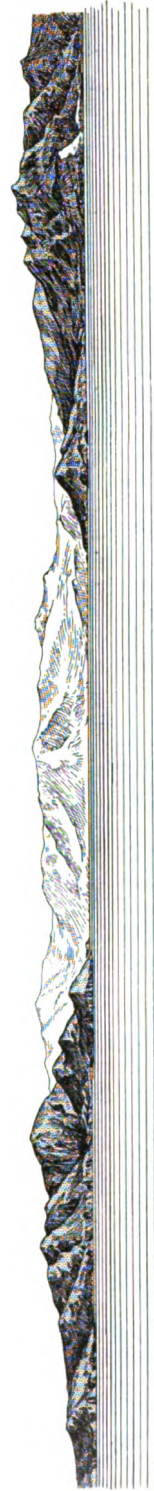
Causeway cove lies on the north-eastern side of Huang tao; Cayley rock, which dries 2 feet (0^m6), lies in the entrance to this cove.

Charts 1255, 1256, 1262.



Ch'ing-shan t'ou (N.E. promontory),
from northward, distant 12 miles,
(Lighthouse not shown).

Shan-tung kao-chiao (promontory).
(Original prior to 1873).



Liu-kung tao.

Ch'ing tao (tao),
bearing 248°, 3 miles.

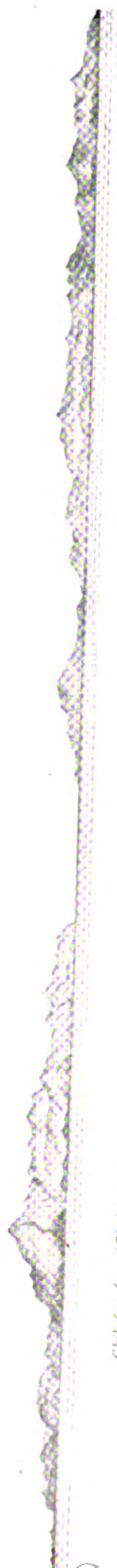
Wei-hai-wei ch'iang, western entrance.
(Original dated 1880).



Chih-fou tung-chiao
(*Chefoo cape*).

*Stuck-up rock in line with hillock
on Ku tao, bearing 340.*

View of Yen-t'ai Chiang (Chefoo Harbour): mark for clearing Kung-tung-tao tsui (spit).
(Original dated 1860).



Chih-fou fong (Chefoo peak),
bearing about 140°, 6 miles.

Chih-fou tao (Chefoo bluff) and land southward.
(Original dated 1872).

Chart 3457.

Western entrance.—Islands and dangers.—Beacon.—The western entrance to Wei-hai-wei chiang is between the western end of Liu-kung tao and Pei-shan tsui, (page 432), situated on the mainland north-westward. A chain of islands and rocks extends fully three-quarters of a mile north-eastward from Pei-shan tsui. *See view facing page 434.* Wai shih (Outer island) (*Lat. 37° 32' N., Long. 122° 10' E.*), 39 feet (11^m9) high, the outermost of these islands, is situated nearly 9 cables north-north-westward of Kwoa-pu, and has a white stone beacon on it; a rock, 20 feet (6^m1) high, lies close north-westward of Wai shih, and a rock, 5 feet (1^m5) high, lies close southward of the island. Some rocky pinnacles, from one to 2 feet (0^m3 to 0^m6) high, lie about one cable south-westward of Wai shih.

Ch'ing tao (tau), 80 feet (24^m4) high and situated nearly 4 cables south-westward of Wai shih, is dome-shaped and covered with grass; there is a clear, deep passage between this island and the rocky pinnacles lying south-westward of Wai shih. There is foul ground, on which are Hei tau and another islet, between Ch'ing tao and Pei-shan tsui. Vessels and boats should not attempt to pass between Ch'ing tao and Pei-shan tsui, but should pass north-eastward of Ch'ing tao.

Grafton point is situated nearly 2 cables southward of Pei-shan tsui, and between the former and Chi-ssu-t'ai (Tsua-chü-tai), a point lying about one mile south-westward, are three indentations in the coast. In Weigall cove, the middle one of the three, is a stone jetty, the outer end of which just dries; a reef, with some rocks above water on it, extends nearly one cable from the south-western entrance point of Weigall cove.

Narcissus bay.—Piers.—Lights.—Narcissus bay, entered between Chi-ssu-t'ai and Chu-tao chiao (page 434), is mostly used by junks; large fleets of junks come from the southern shore of Po hai and places in the locality to fish when the herring season commences in spring. Wei-hai-wei is a walled town at the head of the bay. The agents of the shipping firms and banks reside at Ma-t'ou-chieh (Mato), a village on the northern shore of the bay. Wei-hai-wei ho discharges into the head of the bay. There is a stone pier at Ma-t'ou-chieh, and steamboats can proceed alongside it at any state of the tide; two lights are exhibited from a small white beacon and iron post at the head of this pier. Victory pier is situated about 3 cables westward of Ma-t'ou-chieh pier, and two lights are exhibited on an iron post on its head. All the above lights were reported, in 1945, to be extinguished.

Anchorage.—Vessels of deep draught can anchor south-westward of the south-western extremity of Liu-kung tao, but it must be borne in mind that the depths decrease suddenly off this end of the island; a good berth in winter is in a depth of about 31 feet (9^m4), good holding ground, with the head of the pier bearing 080°, distant 5 cables. Vessels with a draught of not more than 16 feet (4^m9) can anchor almost anywhere southward of Liu-kung tao.

Off the western side of Liu-kung tao the bottom is soft and vessels sometimes drag.

Anchorage can be obtained off Ma-t'ou-chieh, in Narcissus bay, in depths of from 12 to 18 feet (3^m7 to 5^m5); this anchorage is frequented by local steam vessels.

Charts 1255, 1256, 1262.

Chart 3457.

Vessels of deep draught can anchor off Weigall cove, clear of the prohibited anchorage (*see* below) as defined by the *white* sector of Chu-tao-chiao light, in depths of from 27 to 33 feet (8^m2) to 10^m1).

- 5 Vessels of light draught can anchor south-eastward of Chi-ssu-t'ai, in depths of from 21 to 23 feet (6^m4 to 7^m0).

Northerly winds usually set in early in September, and anchorage in the western entrance is not recommended then. With strong winds from eastward of north or south a swell sets through the eastern
10 entrance, rendering the anchorage uncomfortable and raising a short sea which is troublesome to boats.

Prohibited anchorage.—Anchorage is prohibited in both eastern and western entrances within the *white* sectors of Chu-tao-chiao light (*Lat.* 37° 30' N., *Long.* 122° 08' E.).

- 15 **Tidal streams.**—The east-going stream at Wei-hai-wei chiang begins 2 hours before high water, and the west-going 4 hours after high water; but the times of the turning of the streams depends greatly on the direction and force of the wind; with strong south-easterly and easterly winds the west-going stream continues all
20 day, as does the east-going stream after strong north-westerly winds.

Generally, the streams follow the direction of the coast and attain a rate of 1½ knots at Wei-ha-wei chiang. The duration of slack water is usually from one to 2 hours.

- 25 The west-going stream divides at Hu-an-lok rocks, where there are eddies and overfalls; the northern portion follows the coast, and the southern portion passes southward of Liu-kung tao and turns northward through the western entrance. These streams meet at Ch'ing tao and Wai shih, causing eddies, and the combined stream runs at the
30 rate of 2½ knots at springs off the coast north-westward; this stream is much weaker 5 miles off-shore.

The east-going stream divides at Wai shih into two branches, one passing northward, and the other westward and southward, of Liu-kung tao, which meet again at Hu-an-lok rocks.

- 35 The tidal streams close to the southern coast of Liu-kung tao turn considerably earlier than they do at the anchorage, and attain a rate of 3 knots at spring tides at the western end; the west-going stream is the stronger.

The tidal streams along the coast in the vicinity of Wei-hai-wei
40 chiang run in the opposite direction to those at some miles off the land, where the west-going stream begins one hour before high water, and the east-going stream 5 hours after high water.

- Caution is necessary when approaching the land in the vicinity of Wei-hai-wei chiang from northward in thick weather, as the line of
45 change in the tidal streams along the coast is difficult to determine and considerable error in the estimated position may result, the error usually being eastward or westward.

- Directions.**—A vessel making for Wei-hai-wei chiang by the eastern entrance should pass about midway between Hu-an-lok
50 rocks and Jih tao, and thence as requisite for the anchorage selected. After passing Jih tao the depths decrease to less than 18 feet (5^m5) over an extensive flat extending southward from Liu-kung tao, but increase again as the western end of this island is approached. At night, the *white* sector of Chu-tao-chiao light between the bearings

Chart 3457.

of 272° and 281° will be of assistance, but it leads over the tail of the flat extending southward from Liu-kung tao.

A vessel can also pass southward of Jih tao, giving Davy rocks a berth of a quarter of a mile. 5

A vessel proceeding to the anchorage off the south-western extremity of Liu-kung tao by the western entrance should pass about midway between Kwoa-pu and Wai shih, and thence about 3 cables off the western side of Liu-kung tao and 2 cables westward of Huang tao, continuing southward until an old fort near Chao-pei tsui is 10 in line with the beacon on Jih tao (*Lat. 37° 29' N., Long. 122° 12' E.*), bearing 124°, which leads to the anchorage. At night, the *white* sector of Chu-tao-chiao light between the bearings of 220° and 228° will be of assistance. The western entrance must always be used by vessels of deep draught. 15

Harbour facilities.—Supplies.—Communications.—Cargo is handled by lighters, of which about 60, with capacities of 17 to 30 tons, are available.

Small repairs can be undertaken.

There are two small hospitals. 20

Fresh provisions are plentiful. A small stock of coal is maintained and is delivered by lighters. Water is supplied by water-boat; it should be boiled before drinking.

There is regular communication by sea with Hong Kong, Shang-hai, Yen-t'ai (Chefoo), and T'ien-ching (Tientsin). Liu-kung tao and Wei- 25 hai-wei are connected to the general telegraph system.

There is a radio station at Wei-hai-wei; *see* page 39.

Climatic table.—*See* Chapter I, page 73.

Charts 3457, 1260.

COAST.—Wei-hai-wei to Yen-t'ai.—General remarks.—From Wei- 30 hai-wei the coast trends generally westward for about 30 miles to Ma shan, the eastern limit of Yen-t'ai chiang (Chefoo harbour). This stretch of coast is mostly fronted by low sandy plains backed by high land further inland. There are a few unimportant bays and inlets, but Yang-ma tao, a large island close eastward of Ma shan, is the 35 only remarkable feature.

Chart 3457.

Coast.—Danger.—Shang-yai-sha-tan, a bay entered between Ch'ing tao and Chiang-ku tsui (Shang-hing point), situated about half a mile north-north-westward, is open to north-easterly winds, which 40 raise a heavy sea; it is mostly used by fishing junks, and there are two villages at its head, the larger being named Ho-ching (Hau-ching).

Peaked point, situated about a quarter of a mile northward of Chiang-ku tsui, is the eastern extremity of Hei tao (Ku-shi island), a 45 cliffy islet, 96 feet (29^m3) high, connected to the mainland by a rocky ridge.

Liu-chu wan (bay) entered between Hei tao and Mao-t'ou (Mau-to) shan, a bold headland situated about one mile north-westward, is deep, but it is not recommended as an anchorage; a rock, 3 feet 50 (0^m9) high, lies about 2 cables south-eastward of Mao-t'ou shan. Ching-tzu t'ou (Ching-tsu shan) is a steep-to point lying about 1½ miles west-north-westward of Mao-t'ou shan, the coast between being

Charts 1255, 1256, 1262.

Chart 3457.

rugged and indented by several small bays. A prominent white stone monument stands on the summit of a hill, 361 feet (110^m0) high, situated about 3 cables south-eastward of Ching-tzu t'ou.

8 *Charts 3457, 1260.*

P'u-t'ao-t'an.—Island and dangers.—Anchorage.—P'u-t'ao-t'an (Waterwitch bay), a bay entered between Ching-tzu t'ou and Yao-ya (Yaoyao) tsui or Long point, situated about 2½ miles westward, affords good anchorage with offshore winds, but a heavy swell sets in with
10 northerly and north-westerly winds. Yao-ya tsui is the extremity of a tongue of land which forms the western side of the bay and rises to Yao-ya shan (Dawson hill), a well-defined peak, 685 feet (208^m8) high, situated about 1½ miles south-south-eastward of the point.

Ch'u tao (tau) or Eddy island is 225 feet (68^m6) high and lies about
15 three-quarters of a mile north-eastward of Yao-ya tsui, and its coast consists partly of scarped cliffs. A rock, which dries 6 feet (1^m8), with irregular depths around, lies about one cable off the north-eastern point of the island; a rocky patch, with a depth of 2½ fathoms (4^m6) over it, lies about 2 cables eastward of this rock. A 1½-fathom
20 (3^m2) patch lies about a quarter of a mile southward of the south-eastern point of the island, and there is foul ground between this patch and the coast south-westward.

The best anchorage is in the middle of a bight on the eastern side of the bay. There is no good landing place in the bay.

25 **Outlying obstruction.**—An obstruction, not dangerous to surface craft, was reported in 1936 nearly 2½ miles north-eastward of Ch'u tao.

Chart 1260.

Coast.—Islands.—Anchorage.—Tidal streams.—Ta-shih (Hsiaoshih) tao (*Lat.* 37° 32' N., *Long.* 122° 00' E.) is an islet, 112 feet (34^m1)
30 high, connected to a point situated nearly 3½ miles south-westward of Yao-ya tsui. Between these two points are two bays, Ma-tzu chiang (Matsu kan) and Shih-tao-t'an (Shitau-han), which have sandy beaches and are separated from each other by a headland 367 feet (111^m9) high.

35 Between Ta-shih tao and White Rock point, situated about 17½ miles westward, the coast consists of a sandy beach backed by a sandy plain. About 1½ miles southward of Ta-shih tao is a rocky point 131 feet (39^m9) high, and immediately southward of this point is the entrance to Huang-pu (Hwangpu) chiang. Cap point is
40 situated about 1½ miles south-westward of the rocky point and is the eastern entrance point of Shuang-tao (Shwangtao) chiang, a large inlet which dries except for a narrow gully; its entrance is obstructed by sandbanks and two islets about 30 feet (9^m1) high, the northern of which is named Pei-shuang tao (Peisuwan-do). Shuang-tao chiang
45 is enclosed by Balfour promontory, which also forms the western side of its entrance. Shuang-kao shan (Sandy hill), 490 feet (149^m3) high, situated about one mile south-eastward of Cap point, is conspicuous. Small junks enter the inlet and some anchor outside the entrance. About 5 miles eastward of White Rock point is Chin-shan chiang, an
50 anchorage situated in a lagoon which can only be entered by small junks at high water.

There are a few isolated hills along the coast between Balfour promontory and White Rock point, rising a few miles inland to a rugged, mountainous range; among these are T'ung-ling shan

Charts 1255, 1256, 1262.

Chart 1260.

(Lagoon hill) and Hare hill, 559 and 806 feet (170^m4 and 245^m7) high, respectively, both of which are conspicuous. A spur of the range runs down towards the coast, and terminates in the conspicuous North-west hill, 858 feet (261^m5) high and situated nearly 5 miles south-eastward of White Rock point.

There are very regular depths of from 9 to 11 fathoms (16^m5 to 20^m1) off the coast between Ta-shih tao and White Rock point, but about half a mile offshore the bottom rises steeply and sounding gives no warning of the approach to land. The tidal streams set roughly parallel to the coast, turning to east-going through north about one hour before high water at Wei-hai-wei (Admiralty Tide Tables Standard Port), and to west-going through south about 6 hours after high water. Their maximum rate is about three-quarters of a knot to $1\frac{1}{4}$ knots.

White Rock point is the north-eastern extremity of Yang-ma tao, a large hilly island separated from the mainland by Lung-men p'ing-chou (Lungmun flats), which dry; Ta shan, 402 feet (122^m5) high, the highest hill on the island, is situated near its south-western end. White Rock point consists of cliffs from 40 to 50 feet (12^m2 to 15^m2) high, and close of it is Lien shih, a white rock 55 feet (16^m8) high. Shamao shan, 233 feet (71^m0) high, is situated about three-quarters of a mile south-westward of White Rock point.

Lung-men chiang.—Lung-men chiang (Lungmun harbour), situated between the south-western end of Yang-ma tao and the mainland, dries over the greater part. The main entrance is through a channel situated between Ta-shan point, the south-western extremity of Yang-ma tao, and White bluff, lying on the mainland southward, where there is a least depth of about 14 feet (4^m3) in the fairway; this channel, however, varies from time to time, and it should be examined and buoyed before entering. Within the entrance the channel through the flats runs in a general easterly direction, and there are depths of from 3 to 4 fathoms (5^m5 to 7^m3) in places. This channel is sheltered from all winds and is nearly half a cable wide for about 4 cables within the entrance; the landing place is by a joss-house on Temple point, which lies about half a mile eastward of Ta-shan point, and which is steep-to. The principal village on the island is situated close north-eastward of Temple point (*Lat.* $37^{\circ} 27' N.$, *Long.* $121^{\circ} 35' E.$). Close southward of the north-eastern end of Yang-ma tao is the entrance to a channel used by junks, which leads through the sand flats to Lung-men chiang; large junks ground within the entrance at low water.

Ch'ing-shui ho (Ninghai river) discharges into the head of Lung-men chiang, and leads towards Mou-p'ing (Ninghai-chow), a town situated about $3\frac{1}{2}$ miles inland, where there is a pagoda visible from seaward.

The entrance to Hsin-an ho (Lungmun river) lies about one mile westward of Ta-shan point.

YEN-T'AI CHIANG.—General remarks.—Harbour limits.—Yen-t'ai chiang (Chefoo harbour) lies in the bay entered between Ma shan, situated about $2\frac{1}{2}$ miles westward of Ta-shan point, and Chih-fou tung-chiao (Chefoo cape), lying about $9\frac{1}{2}$ miles north-westward. The harbour limits, which are indicated by pecked lines on the chart, extended from Chih-fou tung-chiao to Kung-tung tao, the largest

Charts 1255, 1256, 1262.

Chart 1260.

off-lying island, and thence to a position close eastward of Ma shan. There is an outer and an inner harbour, the latter being constructed artificially. The outer harbour is partly sheltered from easterly winds by Kung-tung tao and the adjacent islands, and is available for vessels of any size, but the outer anchorage for vessels of deep draught affords little shelter with northerly gales. The inner harbour is safe and capacious.

Ice.—In January, 1878 vessels were several times frozen in at the anchorage; floating ice, pieces of which were from 4 to 5 feet (1^m2 to 1^m5) thick, extended for miles in the offing and navigation was impeded. In February of that year a steam vessel was beset for three or four hours in the ice northward of Kung-tung tao; this winter was exceptionally cold.

Off-lying islands and dangers.—Buoy.—Pei shih or North rock (*Lat.* 37° 37' N., *Long.* 121° 35' E.) lies nearly 8 miles northward of White Rock point and is 85 feet (25^m9) high; on westerly bearings it appears round, with a smooth top sloping southward, but on southerly and easterly bearings it is wedge-shaped. A small rock, which dries about 9 feet (2^m7), lies about 3 cables north-eastward of Pei shih. These rocks are the outermost dangers in the approach to Yen-t'ai chiang; they are both steep-to, with depths of 9 fathoms (16^m5) around.

Lungtse, an island situated about 2½ miles south-westward of Pei shih, appears to be divided into two parts when seen from eastward; its northern part is wedge-shaped, and its southern and highest part is an irregular mound 175 feet (53^m4) high. Shoal water extends about 3 cables from its southern point.

South-east island, 55 feet (16^m8) high, lies about 1½ miles southward of Lungtse. Three rocks above water and two rocks awash lie between South-east island and the eastern point of Kung-tung tao, situated about one mile west-north-westward; the middle rock is 40 feet (12^m2) high.

Kung-tung tao is 205 feet (62^m5) high in the northern part, its central part is low and sandy, except for a slight elevation in the middle, and there is a hillock, with a flagstaff on it, on its south-western extremity; there is a village on the low part of the island. Kung-tung-tao tsui (spit), which partly dries, extends nearly three-quarters of a mile southward from the south-western point of the island; a red spar buoy, surmounted by a black sphere, is moored close off the extremity of this spit.

An island, 200 feet (61^m0) high, lies about a quarter of a mile northward of Kung-tung tao, with shoal water between; Finger rock, a prominent vertical column of the same height, lies close off the western point of this island.

A chain of islands and reefs extends about 2½ miles north-westward from Kung-tung tao; amongst these are Shag island, 52 feet (15^m8) high, and Ku tao or Hsiao-kung-tung tao. Ku tao has a mound 88 feet (26^m8) high, near its centre, and its western extremity, 128 feet (39^m0) high, has the appearance of a separate island. A sandy spit, which nearly dries, extends about 4 cables southward from Ku tao. Stick-up rock, situated at the north-western end of the chain, is a vertical pillar 61 feet (18^m6) high.

Stick-up rock (*Lat.* 37° 35' N., *Long.* 121° 28' E.) in line with the

Charts 1255, 1256, 1262.

Chart 1260.

western end of the mound near the centre of Ku tao, bearing 340° leads about half a mile westward of Kung-tung-tao tsui; *see* view facing page 435.

Light.—Fog signal.—A light is exhibited, at an elevation of 226 5 feet (68^m9), from a circular tower, 45 feet (13^m7) in height, painted red and white in horizontal bands, situated on the northern part of Kung-tung tao. A fog signal is occasionally sounded from the lighthouse (*Lat.* $37^{\circ} 34' N.$, *Long.* $121^{\circ} 31' E.$).

Outer harbour.—Coast.—Beacon.—The south-eastern part of the 10 outer harbour is called Ch'i-shan-so wan (Kisansiu bay), the central part Kung-tung flat, and the north-western part Chih-fou wan (Village bay). Ma shan is a hill on the coast, with a ruined tower on its summit, 260 feet (79^m2) high. Between Ma shan and Yü-tai shan (Knob point), a small promontory situated about 5 miles 15 north-westward, the coast is low and sandy, and contains Ch'i-shan-so wan. The area between Yü-tai shan and the off-lying islands north-eastward is known as Kung-tung flat. Nearly $1\frac{1}{2}$ miles south-westward of Yü-tai shan is a peak 1,315 feet (400^m8) high, and about $1\frac{1}{2}$ miles westward of this peak is a ridge of about the same height 20 with a monument on its summit. K'uei-tai shan (Middle point), situated about $1\frac{1}{2}$ miles north-westward of Yü-tai shan, has a fort on it, and a small pier extends from the western side of this point.

Chart 1260, plan of Chefoo or Yentai inner harbour.

Tower point situated about $1\frac{1}{2}$ miles west-north-westward of 25 K'uei-tai shan, rises steeply to the summit of Yen-t'ai shan (Tower hill). A rock, which dries, lies about half a cable southward of Tower point, and is marked by a black beacon surmounted by a sphere.

Chart 1260.

Chih-fou wan (Village bay), entered between Tower point and Chih- 30 fou tung-chiao, is mostly shallow; Chih-fou-ts'un (Chefoo) is a village situated on the northern shore of this bay. Chih-fou tung-chiao is the eastern extremity of a hilly peninsula, named Chih-fou tao (Chefoo bluff), connected to the mainland by a low isthmus which forms the western side of Chih-fou wan. The peninsula rises steeply 35 to a narrow ridge and Chih-fou feng (Chefoo peak), the summit of this ridge, is 956 feet (291^m4) high and has a double top; *see* view facing page 435, and view on chart 1260. North-west rock, above water, lies about 6 cables east-north-eastward of North-west point, the north-western extremity of the peninsula; Hsiao-shan-tzu 40 (Sentry rock), 50 feet (15^m2) high, lies about one cable off Chih-fou tung-chiao, and is steep-to, although the water for some distance off the rock is often discoloured. A radio mast is erected on the sand hills at the head of Chih-fou wan, and there is a flagstaff on the isthmus connecting Chih-fou tao with the mainland. 45

Anchorages.—Vessels of deep draught can anchor south-westward of Ku tao, but this anchorage is open to strong north-westerly and northerly gales, which are experienced in autumn and winter; the holding ground throughout the harbour is very good, however, and it is unusual for vessels to drag. 50

Small vessels can anchor in Chih-fou wan. Northerly gales send in a heavy swell, and in winter the sea is so heavy during these gales that working cargo in the outer harbour is entirely suspended.

Prohibited Anchorage.—Owing to the existence of submarine

Chart 1260.

cables, anchorage is prohibited southward of a line drawn from Tower point to South-east island (*Lat.* $37^{\circ} 33' N.$, *Long.* $121^{\circ} 32' E.$).

Chart 1260, plan of Chefoo or Yentai inner harbour.

- 5 **Inner harbour.—Anchorage.—Beacons.—Mooring buoys.**—The inner harbour, in the southern part of Chih-fou wan is formed by a mole and a detached breakwater; it has two entrances, one at each end of the breakwater. The northern part of the harbour and both entrances were dredged to a depth of 20 feet (6^m1), in 1927; alongside
10 the breakwater and alongside the quay at the outer end of the mole are areas dredged to a depth of 25 feet (7^m6), where large vessels can berth. There are some mooring buoys in the harbour.

- There are 15 mooring berths in the inner harbour, including 9 for vessels up to 320 feet (97^m5) in length. These berths are all indicated
15 by the intersection of lines given by pairs of transit beacons erected on the mole and breakwater, respectively; each of these beacons consists of an iron tripod surmounted by a staff and diamond. There are also white transit marks on the mole for the position of each anchor. When flag N of the International Code of Signals is displayed
20 on the small house on the extremity of the mole it indicates that a vessel is expected alongside, and vessels should not anchor in Nos. 1, 4, and 7 berths, which are the outer berths in the inner harbour.

- A rock, with a depth of 15 feet (4^m3) over it lies about 2 cables
25 north-westward of Yen-t'ai-shan lighthouse (*Lat.* $37^{\circ} 33' N.$, *Long.* $121^{\circ} 24' E.$) and close southward of No. 8 berth. A rock, which dries, lies about $1\frac{1}{2}$ cables north-westward of this lighthouse and about half a cable offshore; it is marked by a black beacon surmounted by a sphere, named North-west beacon.

- 30 The depths decrease gradually at the head of the harbour, where there is a boat harbour with a depth of 5 feet (1^m5) in the entrance. The most convenient landing place is at Kaiping jetty, on the eastern side of the harbour, where there are several sets of steps with a depth
35 of 4 feet (1^m2) alongside. Boats from vessels in the outer harbour entering by the south entrance should give the northern coast of Yen-t'ai shan a wide berth, and should pass outside North-west beacon.

Strong winter gales greatly effect the depths in the harbour; under very abnormal conditions, with westerly gales and ice, less depths than are shown on the chart have been known.

- 40 **Lights.**—A light is exhibited at an elevation of 175 feet (53^m3), from a white lantern on a white tower situated on Yen-t'ai shan.

A light is exhibited, at an elevation of 28 feet (8^m5), from a red iron framework structure on the southern end of the breakwater. A light
45 is exhibited, at an elevation of 18 feet (5^m5), from a black iron framework structure on the northern end of the breakwater.

A light is exhibited, at an elevation of 18 feet (5^m5) from a red iron framework structure on the head of the mole.

- Pilotage.**—The pilotage ground for Yen-t'ai is within a radius of 2 miles from the breakwater. Pilotage is not compulsory, but is
50 advisable.

Chart 1260.

Directions.—The mountain, 1,315 feet (400^m8) high, situated nearly $1\frac{1}{4}$ miles south-westward of Yü-tai shan, bearing 248° leads to the southern entrance of the Outer harbour, passing fully half

Chart 1260.

a mile southward of Kung-tung-tao tsui ; after rounding this spit, proceed as convenient for the anchorage. The southern entrance of the outer harbour has a least depth of $4\frac{1}{2}$ fathoms (7^m8) in the fairway.

Vessels of deep draught must use the northern entrance, passing between Hsiao-shan-tzu and the shoals extending north-westward from Ku tao, thence anchoring south-westward of this island. 5

Chart 1260, plan of Chefoo or Yentai inner harbour.

Vessels proceeding into the inner harbour, and using the southern entrance, must give the end of the breakwater a berth of at least a quarter of a cable ; the coast by Tower point must be given a berth of fully half a cable. When a red flag is exhibited at the southern end of the breakwater vessels must proceed dead slow. The southern entrance to the inner harbour is intended primarily for the use of inward-bound vessels, but outward-bound vessels may use it if no inward-bound vessel is seen approaching. 15

Harbour regulations.—The following are extracts from the Harbour regulations for Yen-t'ai, which, so far as is known, are still in force :—

1.—The term vessel in these regulations refers to vessels of foreign type. 20

2.—The control of the Harbour authorities extends over the water comprised within a line drawn from Chih-fou tung-chiao to the north-eastern end of Kung-tung tao, and from the eastern end of this island in a southerly direction to the coast immediately eastward of Ma shan (Lat. $37^{\circ} 27' N.$, Long. $121^{\circ} 31' E.$). The area contained within the breakwater and the mole is termed the Inner harbour, while the remaining portion is termed the Outer harbour. 25

3.—The anchorages for vessels are :—

(a) For vessels other than those provided for in (b) and (c) : within the inner harbour or as near thereto as draught and available space permit. 30

(b) For vessels carrying explosives, mineral oil, etc.: not nearer than half a mile to the inner harbour or the shore and as near to that limit as draught and available space permit.

(c) For quarantine purposes : outside the inner harbour and as directed by the Harbour-master. 35

5.—Incoming vessels have right of way in the entrances to the inner harbour.

6.—Vessels shall moor in accordance with the instructions received from the Harbour-master, and shall not shift their berths without special permission, except when outward bound after having obtained their clearance papers or through stress of weather. 40

7.—Applications for berths or for permission to shift berth must be made at the Harbour-master's office by the master, or by an officer or agent of the vessel, when the necessary instructions concerning the berth will be given. If a vessel be instructed by the Harbour-master to shift her berth she shall do so. 45

8.—Transient vessels entering the port must be examined by the Harbour authorities before any communication with the shore or other vessels is allowed, or any passenger or member of the crew are allowed to go on shore or cargo to be landed. 50

9.—No cargo shall be loaded or unloaded, nor shall any passengers or crew land or embark at places other than those appointed by the Harbour authorities.

Charts 1255, 1256, 1262.

Chart 1260, plan of Chefoo or Yentai inner harbour.

12.—Vessels arriving with mineral oil, or cargo of a highly inflammable nature, shall, on approaching the port, display a red flag at the fore, anchor as provided in Article 3 (b), and remain there until all such
5 cargo has been discharged or permission given to take up another berth.

14.—Vessels having any infectious disease on board or any disease suspected to be infectious, or the body of a person who died, or is suspected of having died, of an infectious disease, shall, on approach-
10 ing the port, display the quarantine flag, anchor as provided for in Article 3 (c), and keep the flag flying until pratique has been granted.

17.—Vessels within the inner harbour must either moor or secure to a buoy; they may not lie at single anchor without special per-
15 mission from the Harbour-master.

Yen-t'ai.—The town of Yen-t'ai stands on the sandy shore of a small bay in the inner harbour immediately westward of Yen-t'ai shan. On the southern slope of the hill are some European houses, the former British Consulate being nearest the summit, but many
20 foreign residences, enclosed by walls, are also built along the sandy beach between Tower point and K'uei-tai shan. The Custom house and jetty, where all imports must be landed, is situated southward of Kaiping jetty.

The population, in 1952, was about 250,000.

25 There is a large fruit growing industry in the country around Yen-t'ai. The manufacture of silk is carried out on a large scale, and there is an extensive fishing industry.

Harbour facilities.—**Supplies.**—**Communications.**—There are about 250 lighters for loading cargo, each with a capacity of 20 tons.

30 Small repairs can be undertaken.

A tug is available.

There are two hospitals.

Fresh provisions are plentiful. Small quantities of stores are procurable. Water can be supplied in large quantities; it should
35 be boiled before drinking.

There is a stock of coal, which is shipped from lighters. Fuel oil can be supplied by lighters in any quantity with two weeks notice. A stock of Diesel oil is maintained, but large quantities must be ordered in advance; the oil is delivered in lighters.

40 There is regular communication by sea with T'ien-ching, Wei-hai-wei, Shang-hai and Ta-lien (Dairen). Yen-t'ai is connected to the general telegraph system, and there is a local telephone service. There is a radio station, *see* page 39.

Storm signals.—Storm signals are displayed at the signal station
45 on Yen-t'ai shan (*Lat. 37° 33' N., Long. 121° 24' E.*). In 1949 the signal station was reported to have been destroyed.

Climatic table.—*See* Chapter I, page 74.

Chart 1255.

COAST.—**Yen-t'ai to Teng-chou t'ou.**—**Dangers.**—**Anchorage.**—
50 **Directions.**—The coast between the north-western extremity of Chih-fou tao and Lung-tung tsui (Sloping point), situated about 10 miles west-north-westward, forms a bay with a sandy beach.

Ti chiao (Low point), with a prominent hill 334 feet (101^m8) high,

Charts 1256, 1262.

Chart 1255.

close eastward of it, is situated about $12\frac{1}{2}$ miles north-westward of Lung-tung tsui. A rock, which dries about 7 feet (2^m1), lies about $2\frac{1}{2}$ miles south-eastward of the 334-foot (101^m8) high hill and about one mile offshore.

5

Chart 1392.

Teng-chou t'ou (Tengchau head) (*Lat. $37^{\circ} 50' N.$, Long. $120^{\circ} 44' E.$*) situated about 8 miles westward of Ti chiao, has steep cliffs and is 243 feet (74^m1) high.

P'eng-lai (Tengchau-fu), situated nearly one mile southward of 10 Teng-chou t'ou, is surrounded by a wall, and an opening in its seaward face forms the entrance to a small camber; the entrance, however is so shallow that even a moderate sea breaks across it, and communication is impossible with strong winds from between east-north-east and north-west. There is a post and telegraph office, and com- 15 munication is maintained by sea with Yen-t'ai.

A rocky ledge, which dries at its outer edge, extends nearly one mile from the coast about $1\frac{1}{2}$ miles eastward of Teng-chou t'ou; to avoid this ledge, from eastward, the hill, 334 feet (101^m8) high, near Ti chiao should not bear less than 106° until the light-tower on 20 Teng-chou t'ou bears 243° , when course can be shaped towards the camber anchoring northward of P'eng-lai in depths of from 3 to 6 fathoms (5^m5 to 11^m0). The anchorage, which is suitable for vessels with local knowledge, is partially protected from eastward by the rocky ledge just mentioned, and from westward by Teng-chou tui 25 (Tengchau bank), described on page 446, but with northerly winds there is a heavy breaking sea, which renders the anchorage unsafe.

Light.—A light is exhibited, at an elevation of 250 feet (76^m2), from a small white tower on Teng-chou t'ou.

Chart 1255.

30

Off-lying shoal.—A rocky patch, with a depth of $4\frac{1}{2}$ fathoms (7^m8) over it, was reported, in 1919, to lie about $12\frac{1}{2}$ miles north-north-eastward of Chih-fou tung-chiao. This danger was unsuccessfully searched for in 1920.

Charts 1256, 1262.

CHAPTER IX.

POHAI STRAIT—PO HAI—LIAO-TUNG WAN.

Chart 1392.

POHAI STRAIT.—General remarks.—Pohai strait, situated between the land in the vicinity of Ten-chou t'ou (page 445) and the southern extremity of Kuan-tung pan-tao (Kwantung peninsula),
 5 situated about 54 miles northward, connects Yellow sea to Po hai (Gulf of Pohai). Miao-tao lieh-tao (Miau-tau group), comprising 15 islands and a number of small rocks, lies within a distance of about 35 miles northward from the southern side of the strait.

Miao-tao hai-hsia.—Dangers.—Buoy.—Teng-chou tui (Tengchau
 10 bank) extends about $7\frac{1}{2}$ miles west-north-westward from Teng-chou t'ou (*Lat.* $37^{\circ} 50' N.$, *Long.* $120^{\circ} 44' E.$), and has several heads on it with depths of only 4 feet (1^m2) over them; among these are Ssu-jen chou, Erh-jih chou and Ch'ao-tao chou, situated, respectively, about $1\frac{1}{2}$, $2\frac{1}{4}$ and $4\frac{1}{2}$ miles west-north-westward of Teng-chou t'ou. Hsing-
 15 chin chou, situated near the north-western extremity of the bank, has a depth of $2\frac{1}{4}$ fathoms (4^m1) over it, and is marked by a black buoy with a conical topmark. It is stated that the depths over Teng-chou tui and in this vicinity are constantly changing, and in 1936 it was reported that the depths about $1\frac{1}{2}$ miles westward of
 20 Teng-chou t'ou were about 10 feet (3^m0) less than those charted.

Miao-tao hai-hsia (Miau-tau strait) or Tengchow channel is bounded southward by Teng-chou t'ou and Teng-chou tui, and northward by Nan-ch'ang-shan tao (South Chang shan), Miao tao (Miau tau), and Ta-hei-shan tao (Ta-hi shan), the southernmost islands of Miao-tao
 25 lieh-tao; the dangers on the northern side of the strait are described below. This strait is deep in the fairway and is navigable, but there are much better channels between the islands northward of Ch'ang-shan tao (*see* below).

Tidal streams.—In Miao-tao hai-hsia the tidal stream sets eastward
 30 with the rising tide, and westward with the falling tide, but a few miles westward of the strait the reverse is the case. The east-going stream in the strait attains a maximum rate of $3\frac{1}{2}$ knots, and the west-going stream 3 knots.

Ch'ang-shan tao and adjacent islands.—Dangers.—Buoy.—Ch'ang-
 35 shan tao is a large island divided into two parts by a narrow shingle isthmus; the northern part is called Pei-ch'ang-shan tao (North Chang shan), and the southern part Nan-ch'ang-shan tao (South Chang shan). Both parts are hilly, and Sung shan (Cairn hill), the summit of Pei-ch'ang-shan tao is 659 feet (200^m9) high. The eastern

Charts 1255, 1256, 1262.

Chart 1392.

coasts of both parts are bold, cliffy, and steep-to, except for a few rocks lying close off-shore. Pi-hsien ch'i (Island head) is the eastern extremity of Nan-ch'ang-shan tao. Ch'ang lai (Chang-shan Tail) is a sandy spit which extends about $1\frac{1}{2}$ miles southward from Chiang tsui (Spit point), the southern point of Nan-ch'ang-shan tao; the inner part dries, and there is a depth of 2 fathoms (3^m7) over the extremity of the outer part, which is marked by a red conical buoy. A tidal overfall over the spit extends, like breakers, for a considerable distance across Miao-tao hai-hsia.

A bank, with depths of less than 3 fathoms (5^m5) over it and some above-water rocks on it, extends as much as $2\frac{1}{2}$ miles westward from the western side of Ch'ang-shan tao, and Miao tao (Miau tau), an island 319 feet (97^m2) high, lies on the south-western extremity of this bank. Two islets, each 92 feet (28^m0) high, and connected to Miao tao at low water, lie respectively, close off the north-western and south-western sides of this island; the northern islet is called Yang t'o-tzu (Club point), and the southern Niu t'o-tzu. Nan k'ou (Depot bay) lies between Niu t'o-tzu and Miao tao. Hsiao-p'ing tao, 59 feet (18^m0) high, lies about half a mile northward of Tung-pei tsui-tzu (Temple point), the northern extremity of Miao tao. A $4\frac{1}{2}$ -fathom (8^m7) patch and a 5-fathom (9^m1) patch lie about one and 2 miles, respectively, southward of Miao tao (*Lat.* $37^\circ 56' N.$, *Long.* $120^\circ 40' E.$)

Ta-hei-shan tao (Ta-hi shan) is separated from Miao tao by Miao-tao ao (Hope sound); its western extremity is a cliffy bluff 622 feet (189^m6) high. Yün-liang tao, 67 feet (20^m4) high, lies about one mile south-south-eastward of the southern extremity of Ta-hei-shan tao, with Ta t'o-tzu, a larger island 61 feet (18^m6) high, between. Yü-nan chiang, a reef with depths of less than 6 feet (1^m8) over it in places, and a drying patch near its centre, extends about one mile east-south-eastward from Yün-liang tao.

Hsiao-hei-shan tao (Siau-hi shan), Chen-chü-men (Tan-ruan-tsu), and Pao-t'a-men (Ellis island) are islands lying between Ta-hei-shan tao and Pei-ch'ang-shan tao. Hsiao-hei-shan tao is 326 feet (99^m4) high, and is separated from Ta-hei-shan tao by Hei-shan shui-tao, and from Chen-chü-men and Pao-t'a-men by Miao-tao shui-tao; Lu-chupa-tzu, an islet 56 feet (17^m1) high, lies off its north-eastern side. Chen-chü-men is 181 feet (55^m2) high, and its northern end lies about half a mile south-westward of Hsi-pei tsui (North-west point), the north-western point of Pei-ch'ang-shan tao; some rocks above water lie about 4 cables south-eastward of its southern extremity, which is a sandy spit. A flat, with depths of 2 fathoms (3^m6) and less over it, extends about $1\frac{1}{2}$ cables from the eastern side of this island, and a reef, with some rocks above water on it, extends about 2 cables northward from its north-eastern point.

Rocky shoals and rocks, both sunken and above water, lie within one mile northward of Pao-t'a-men, and they should be given a wide berth. The tidal streams set east-south-eastward past the rocks during the rising tide, and westward during the falling tide; there are tide-rips in their vicinity.

Lights.—A light is exhibited, at an elevation of 68 feet (20^m7), from an iron framework structure on Ch'iao tsui-tzu (Ship point), the south-western point of Nan-ch'ang-shan tao.

Charts 1255, 1256, 1262.

Chart 1392.

A light is exhibited from the northern extremity of Pei-ch'ang-shan tao (*Lat.* 38° 00' N., *Long.* 120° 41' E).

Anchorage.—**Tidal streams.**—Anchorage can be obtained off the south-western coast of Nan-ch'ang-shan tao, between Chiang tsui and Ch'iao tsui-tzu, in depths of from 4½ to 6½ fathoms (7^m8 to 11^m4), sheltered from north-easterly and easterly winds. Also between the north-western side of Nan-ch'ang-shan tao and Miao tao, in depths of about 2½ fathoms (4^m1).

Miao-tao ao is a summer anchorage, but it is not recommended in winter, when northerly winds prevail, and the only places where shelter might be obtained, such as southward of Hsiao-hei-shan tao, are two shoal on account of the shallow spit which extends about one mile southward from that island. A part of the east-going stream through Miao-tao hai-hsia turns northward through the sound, and during northerly winds causes vessels to lie broadside to the swell.

There is anchorage in a depth of about 5 fathoms (9^m1) north-westward of Miao tao, and about midway between this island and Hsiao-hei-shan tao. This area is known as Miao-tao mao-ti.

20 Chart 1392, plan of Tan ruan anchorage.

Tang-luan mao-ti (Tan-ruan anchorage) lies between the north-western side of Pei-ch'ang-shan tao and Chen-chü-men; it can be approached from either northward or southward, the former being the deeper. The southern entrance has a least depth of 3½ fathoms (5^m9) in the fairway. The anchorage space is about 4 cables wide, with depths of from 4 to 7 fathoms (7^m3 to 12^m8), stiff mud; it is advisable to moor, as vessels are generally tide rode. This anchorage is secure at all seasons, being protected by the surrounding islands and reefs, and although northerly winds cause a ground swell, it is not enough to inconvenience a vessel of moderate size. Landing can always be effected.

Chart 1392.

In Miao-tao ao and Tang-luan mao-ti the tidal stream sets northward with the rising tide, and southward with the falling tide.

Directions.—When entering Miao-tao hai-hsia from eastward care must be taken to avoid Ch'ang lai; the hill on Ti chiaio (page 444) bearing 106° leads northward of the rocky ledge extending from the coast eastward of Teng-chou t'ou and southward of Ch'ang lai. When entering from westward, Teng-chou t'ou should be kept bearing not less than 122°, which leads clear of the outer part of Teng-chou tui.

Vessels proceeding to the anchorage off the south-western coast of Nan-ch'ang-shan tao should keep Tung-pei tsui-tzu bearing not less than 330° and open westward of Ch'iao tsui-tzu, which leads westward of Ch'ang lai.

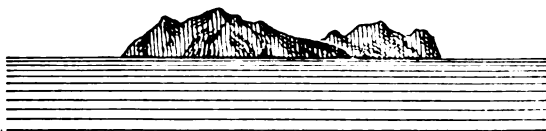
Vessels proceeding to the anchorage in Miao-tao ao from Miao-tao hai-hsia should steer for the western side of Chen-chü-men bearing 009° and open westward of Yang t'o-tzu; thence pass close westward of Yang t'o-tzu, and anchor with Sung shan bearing 052°, and Tung-pei tsui-tzu (*Lat.* 37° 57' N., *Long.* 120° 41' E.) bearing 094°, or near this position, in depths of from 4 to 5 fathoms (7^m3 to 9^m1).

Miao-tao lieh-tao.—**Central group.**—**Channels.**—**Dangers.**—**Tidal streams.**—**Anchorage.**—Ta-chu-shan tao (Tachu shan), the south-

Charts 1255, 1256, 1262.

Chart 1392.

eastern island of the Miao-tao lieh-tao, lies about 10 miles east-north-eastward of Pei-ch'ang-shan tao; it is 637 feet (194^m2) high and of barren appearance, and is bordered by a steep-to beach of white shingle. Hsiao-chu-shan tao (Siau-chu shan), 318 feet (96^m9) high, lies about 2 $\frac{3}{4}$ miles westward of Ta-chu-shan tao; a shoal, with a depth of 1 $\frac{1}{2}$ fathoms (2^m7) over it, extends nearly half a mile southward from the island, and a reef extends about one cable from its northern end. Ch'e-yu tao (Sha-mo tau), 258 feet (78^m6) high, lies about 2 $\frac{1}{2}$ miles northward of Hsiao-chu-shan tao; a reef, with a depth of 1 $\frac{3}{4}$ fathoms (3^m2) over its outer end, extends about three-quarters of a mile from its southern end. See view below.



*Hsiao-chu-shan tao (Siau-chu shan), bearing 350°.
(Original dated 1872).*

Hou-chi tao (Howki), 299 feet (91^m1) high, lies about 4 $\frac{1}{4}$ miles north-westward of the northern point of Pei-ch'ang-shan tao; reefs extend about a quarter of a mile from its northern end. See 15 view below.



*Hou-chi tao (Howki), bearing 311°,
(Lighthouse not shown.)
(Original dated 1872).*

Ch'ang-shan shui-tao (channel), situated between Pei-ch'ang-shan tao and Hou-chi tao, is the best channel through Miao-tao lieh-tao, and the only dangers are the rocks extending northward from Pao-t'a-men (page 447). The tidal streams set eastward during the rising tide, with a maximum rate of 2 $\frac{3}{4}$ knots, and westward during the falling tide, with a maximum rate of 3 knots.

Nan-t'o-chi shui-tao (Chin-chu-mun channel) and Hou-chi shui-tao (Kao-shan channel) lead northward of Ch'e-yu tao and Hou-chi tao respectively, and are both deep and free from dangers in the fairway. On the northern side of Nan-t'o-chi shui-tao are Lao-tung chiao (Hesper rock) and Ts'eng-chih-fou (Tsen-leang-shu); the former lies nearly 5 miles north-north-eastward of Ch'e-yu tao, dries 4 feet (1^m2), and at the highest tides is marked only by a break or a ripple; Ts'eng-chih-fou, a rock with a depth of less than 6 feet (1^m8) over it, lies about 3 $\frac{1}{2}$ miles westward of Lao-tung chiao. Both these rocks are steep-to.

T'o-chi tao (Toki tau) lies with its eastern extremity about 6 $\frac{1}{4}$ miles north-westward of Ch'e-yu tao, and has a prominent peak, 676 feet (206^m0) high, in the northern part. A rock lies about 4 cables south-eastward of the eastern point of the island. Ta t'o-tzu (Mochang-shi) is an islet lying on a shoal which extends about a quarter of a mile

Charts 1255, 1256, 1262.

Chart 1392.

from the western part of the southern coast. Chief bay, situated on the southern coast, affords anchorage to vessels with local knowledge, in depths of from $4\frac{1}{2}$ to $6\frac{3}{4}$ fathoms (8^m7 to 12^m3), sheltered
 5 from northward and partially from westward. There are villages on the southern and north-eastern sides of the island. A small tower stands on a hill on the eastern point of T'o-chi tao. Hou-k'ou wan (Back bay) is situated in about the middle of the north-eastern coast, and several rocks lie within about half a mile offshore north-
 10 ward of this bay. There are tide-rips off the northern point of T'o-chi tao. See view below.



*T'o-chi tao (Toki tau), bearing 342°
 (Original dated 1872).*

Kao-shan tao (Kao shan) (*Lat. 38° 08' N., Long. 120° 38' E.*) lies about 4 miles northward of Hou-chi tao and on the northern side of Hou-chi shui-tao; it is a wedge-shaped island, 672 feet (204^m8) high,
 15 with its highest part on the south-western side. Kao-shan shui-tao (South Toki channel) is the passage between Kao-shan tao and T'o-chi tao. See view below.



*Kao-shan tao (Kao shan), bearing 320°.
 (Original dated 1872).*

Lights.—Fog signal.—A light is exhibited from Hsiao-chu-shan tao. A light is exhibited, at an elevation of 327 feet (99^m7), from a black
 20 circular tower, 46 feet (14^m0) in height, with a white dwelling, situated on the summit of Hou-chi tao; a fog signal is occasionally sounded from the lighthouse.

Miao-tao lieh-tao.—Northern group.—Channels.—Dangers.—Tidal streams.—Ta-ch'in tao (Takin tau), 668 feet (203^m6) high, lies with
 25 its southern point nearly 6 miles north-north-eastward of the northern point of T'o-chi tao; its northern and western coasts are fringed by rocks to a distance of about a quarter of a mile. Pei-t'o-chi shui-tao (North Toki channel), situated between these two islands, is not recommended on account of Pei chiao (Fisherman rock), awash,
 30 which lies about $2\frac{3}{4}$ miles north-eastward of the northern point of T'o-chi tao; there is generally a tide-rip over this rock when the sea is smooth, but at slack water, or with any sea, the rock is not marked in any manner. Ta chiao (Unison rock), with a depth of $1\frac{1}{2}$ fathoms (2^m7) over it, lies about 2 miles westward of the southern
 35 point of Ta-ch'in tao. The east-going tidal stream in Pei-t'o-chi shui-tao between Pei chiao and T'o-chi tao attains a maximum rate of $2\frac{1}{2}$ knots, and the west-going stream a rate of $2\frac{1}{2}$ knots.

Charts 1255, 1256, 1262.

Chart 1392.

Hsiao-ch'in tao (Siau-kin tau) 497 feet (151^m5) high, lies about 1½ miles northward of Ta-ch'in tao, and is separated from it by Ta-ch'in shui-tao (Takin-tau channel); this channel is deep and free from dangers, except for the rocks off the northern coast of Ta-ch'in tao. There are tide-rips off the southern coast of Hsiao-ch'in tao, and also off its northern point.

Nan-ch'eng-huang tao (South Hwang-ching tau), 335 feet (102^m1) high, and Pei-ch'eng-huang tao (North Hwang-ching tau), 529 feet (161^m2) high, lie close together north-eastward of Hsiao-ch'in tao, and are separated from it by Hsiao-ch'in shui-tao (Siau-kin-tau channel), which appears to be deep and free from dangers. Tz'u-lo Chiang, a reef, with a depth of 3½ fathoms (6^m4) over its outer end, extends nearly half a mile from a point near the southern end of the western coast of Nan-ch'eng-huang tao, and a reef extends 3 cables northward from the north-western point of this island. Hsing shih, a rock 2 feet (0^m6) high, lies about 4 cables east-north-eastward of the north-eastern point of Nan-ch'eng-huang tao, with a 3-foot (0^m9) patch, named Ai-tang chiao, about one cable west-south-westward of it. Hsi-nan Chiang, a 4½-fathom (7^m8) patch, lies about 3 cables off the south-western point of Pei-ch'eng-huang tao; Lou-mu-chou chiao, a rock, 2 feet (3^m7) high, lies about half a mile off the north-eastern coast, and a 1½-fathom (3^m2) patch, named Tung-nan Chiang, lies about 3 cables off the south-eastern point of the island. A rock, with a depth of less than 6 feet (1^m8) over it, lies about 2½ cables south-westward of Tung-nan Chiang.

Lao-t'ieh-shan shui-tao (Liau-ti-shan channel), situated between Pei-ch'eng-huang tao and the steep-to southern extremity of Kuan-tung pan-tao, situated about 22 miles north-north-eastward, is deep and free from dangers, so far as is known. For the light on Lao-t'ieh-shan-hsi chiao (Liau-ti-shan promontory), situated on Kuan-tung pan-tao, *see* page 486.

Chart 1256.

PO HAI AND LIAO-TUNG WAN. — **General remarks.** — The large inland sea within Pohai strait, called Pei hai by the Chinese, consists of two portions; the southern and major portion is called Po hai (Gulf of Pohai), and the northern portion Liao-tung wan (Gulf of Liaotung). Po hai is bounded southward and south-westward by the great plain which forms the larger part of the provinces of Shantung and Hopeh (Hopei); several rivers flow into it, the principal being Huang ho. Hai ho, on which is situated the city and port of T'ien-ching (Tientsin), flows into the north-western part of the gulf; this river forms the approach to Pei ho, on which is T'ung-hsien (Tung-chau), the port of Peking.

Liao-tung wan lies generally north-eastward of a line joining Lao-t'ieh-shan-hsi chiao (*Lat.* 38° 44' N., *Long.* 121° 08' E.) and the coast near the entrance to Ta-ch'ing (Tatsing) ho, situated about 110 miles west-north-westward. Liao ho, near the entrance to which is the port of Ying-k'ou (Yingkow), flows into the head of Liao-tung wan.

Depths.—There are depths of from 10 to 15 fathoms (18^m3 to 27^m4) in the middle of Po hai, but these decrease towards the south-western shore, where shoal depths extend many miles. At the head

Charts 1255, 1262.

Chart 1256.

of Po hai easterly and south-easterly winds tend to raise the sea level, and northerly and north-westerly winds tend to lower it.

In Liao-tung wan, the depths are from 12 to 33 fathoms (21^m9 to 5 60^m4) in the entrance, decreasing to from 11 to 17 fathoms (20^m1 to 31^m1) in the middle. The depths for a distance of about 45 miles from the head of the gulf are less than 10 fathoms (18^m3).

Ice.—See page 10.

SOUTHERN SIDE OF PO HAI.—Teng-chou t'ou to the entrance to Hai ho.—General remarks.—From Teng-chou t'ou the coast tends generally south-westward for about 60 miles, and is backed by hills of moderate elevation some distance inland; it then trends generally north-westward for about 150 miles to the entrance to Hai ho, and is entirely flat and featureless.

15 Dust storms are prevalent on this coast during April and May, and cause poor visibility.

Chart 1392.

Coast.—Anchorage.—About 2 miles south-westward of Teng-chou t'ou (page 445) is a hill, 414 feet (126^m2) high, with a stone cairn on its summit, and at the foot is a sandy beach. Miao shan (Temple hill), 655 feet (199^m6) high, lies about 3 miles southward of Teng-chou t'ou, and has a prominent high tower on its summit. Table hill, 804 feet (245^m1) high, lies about 2 miles westward of Miao shan (Lat. 37° 47' N., Long. 120° 45' E.).

25 Luan-chia-k'ou chiao (Davenport point), situated about 6½ miles south-westward of Teng-chou t'ou, is low and rocky, and shoal water extends about three-quarters of a mile from it; Ying-k'ou shan (Dark bluff) (chart 1255), 600 feet (182^m9) high, situated about 3 miles south-south-eastward of the point, is prominent on easterly bearings. Ch'in-chia-k'ou (Lwankiakau) is a large village situated immediately eastward of Luan-chia-k'ou chiao, and behind the village is a low hill with an artificial mound on it; there is a prominent tree, with a white tower near it, in the village. A breakwater of large stones extends from the coast off Ch'in-chia-k'ou, and junks moor 35 under its shelter, probably lying aground at low water. There was reported, in 1914, to be anchorage, in a depth of 4 fathoms (7^m3), stiff mud, with the extremity of Luan-chia k'ou chiao bearing 270°, and the mound on the hill behind Ch'in-chia-k'ou in line with the white tower, bearing 191°; landing can be effected in a sandy beach, 40 sheltered by the breakwater. There is a post and telegraph office in the village, and Ch'in-chia-k'ou is a port of call for the small coastal steamers running between Yen-t'ai and Lung-k'ou (Lungkow).

Chart 1255.

The coast between Luan-chia-k'ou chiao and Ch'i-mu-tao kao-45 chiao (Chimatau promontory), situated about 19 miles west-south-westward, is low and sandy. Huang chiao (Hwang point), is situated about 8 miles west-south-westward of Luan-chia-k'ou chiao, and has a small sand-hill on it; Lai shan (Knob hill), 120 feet (36^m6) high, is situated about 3 miles east-south-eastward of Huang chiao. 50 Ye shan, situated about 11 miles southward of Lai shan, and Lao-yün-huang ting, about 4½ miles south-westward of Ye shan, are the highest peaks of a mountain range; they are 2,065 feet (629^m4) and 2,459 feet (749^m5) high, respectively. A ridge extends north-westward

Chart 1262.

Chart 1255.

from Lao-yün-huang ting, terminating in a steep, sharp peak, 1,420 feet (432^m8) high, situated about 12 miles south-westward of Lai shan.

Off-lying island and dangers.—Sang tao (tau), 30 feet (9^m1) high, lies about 1½ miles northward of Huang chiao, and there is a village 5 with a temple on its south-eastern part. The island is surrounded by reefs, some of which dry out 2 or 3 cables, with uneven ground outside them; a detached reef, which dries about 3 feet (0^m9), lies about 7 cables south-eastward of the north-eastern point.

Sha tao (Sand islet), lies about half a mile north-westward of Sang tao, and shoal water extends about a quarter of a mile eastward and westward from this islet. A rock, with a depth of one fathom (1^m8) over it, lies about 8 cables north-westward of Sha tao, and a rocky reef, with a least depth of 1½ fathoms (3^m2) over it, lies about 2 miles north-westward of the same islet. 15

Chart 2653, plan of Lungkow harbour.

Ch'i-mu-tao kao-chiao.—**Light.**—Ch'i-mu-tao kao-chiao (Chimatao promontory) terminates in Ch'i-mu (Chima) shan, a small range of hills, 185 feet (56^m4) high, connected to the mainland by a low sandy isthmus. The northern side of the isthmus is steep-to, but reefs and 20 rocks extend nearly 4 cables westward from the north-western point of the promontory, which is cliffy; the south-western end of the promontory, where there is a village, named Ch'i-mu-tao (Chimatao), at the foot of the hills, is low.

A light is exhibited, at an elevation of 177 feet (53^m9), from a 25 structure situated near the north-western extremity of Ch'i-mu-tao kao-chiao (*Lat.* 37° 41' N., *Long.* 120° 13' E.).

Lung-k'ou wan.—**Lung-k'ou chiang.**—**Buoys.**—**Beacons.**—Lung-k'ou wan (Lun-kau bay) (chart 1255) lies on the southern side of Ch'i-mu-tao kao-chiao. A partly drying sand bank extends about 30 one mile southward from the northern shore of the bay, and is marked by a black conical buoy moored about 2½ miles south-eastward of the lighthouse on Ch'i-mu-tao kao-chiao.

Lung-k'ou chiang (Lungkow harbour) is situated in Lung-k'ou wan, and consists of an outer and an inner harbour. The inner harbour 35 lies north-eastward of a sand spit which extends south-eastward across the bay from a position about 2 miles eastward of the extremity of Ch'i-mu-tao kao-chiao, and of which the first 1½ miles are dry. The channel between the outer and inner harbours is a narrow opening through this sand spit, in which the least depth was 40 reported, in 1940, to be 9 feet (2^m7). It is marked on its northern side by three black can buoys, and indicated by leading lights which are described below.

The city of Lung-k'ou (Lungkow), with a population of about 12,000, in 1940, lies at the head of the bay; it is the seaport of 45 Huang-hsien (Wang-hsien), situated about 14 miles eastward (chart 1255).

Two beacons stand on marshy ground about 2½ and 3½ miles, respectively, eastward of the lighthouse on Ch'i-mu-tao kao-chiao (*Lat.* 37° 41' N., *Long.* 120° 13' E.). A disused concrete pier lies 50 southward of the eastern beacon. A chimney, 101 feet (30^m8) high, at the northern end of Lung-k'ou, is a good landmark. There is a landing place for boats, enclosed by a small breakwater, about half a mile southward of the chimney.

Charts 1256, 1262.

Chart 2653, plan of Lungkow harbour.

- Lights.**—Leading lights are exhibited at the head of the bay and at the southern end of the city of Lung-k'ou. The front light is exhibited, at an elevation of 50 feet (15^m2), from a mast, painted black and white in horizontal bands, with a triangular daymark, situated on the beach; the rear light is exhibited, at an elevation of 60 feet (18^m3), from a similar mast, with an inverted triangular daymark, situated 2 cables eastward of the front light. These lights in line, bearing 084°, lead through the entrance to the inner harbour.
- 10 **Anchorage.**—Vessels anchor in the inner and outer harbours according to their draught and the space available, subject to instructions of the Harbour-Master or the berthing officer, who boards each incoming vessel. The quarantine and explosives anchorages are in the outer harbour according to local regulations. The bottom
- 15 of sand and mud is good holding ground.

A vessel drawing 16½ feet (5^m0) entered the inner harbour in 1939, but vessels drawing over 15 feet (4^m6) usually anchor in the outer harbour.

- Tidal streams.**—The tidal stream in Lung-k'ou wan generally sets south-eastward on the rising tide, and westward on the falling tide. The maximum rate in either direction does not exceed one knot.

Harbour facilities.—**Supplies.**—**Communications.**—Cargo is handled by lighters, of which about 200 are available, with capacities of from 10 to 20 tons. A tug is available for towing lighters.

- 25 There is a hospital.

Coal might be obtained from stocks maintained by steamship companies. Some fresh provisions are obtainable. Water, which should be boiled before drinking, is supplied by water boat.

- Lung-k'ou is connected by telephone and telegraph to Yen-t'ai and Wei-hsien; the latter is situated in about Lat. 36° 45' N., Long. 119° 10' E. Several steamship companies make Lung-k'ou a port of call.

Chart 1255.

- Coast.**—**Dangers.**—**Buoy.**—There is a slight indentation in the coast on the western side of Shih-hu tsui (Shih-hu-swei), a point, from which a reef extends about 2 cables northward, situated about 14½ miles south-south-westward of Ch'i-mu-tao kao-chiao; it is used by junks with off-shore winds. A rock, with a depth of 2½ fathoms (4^m1) over it, lies about 3 miles north-eastward of this point.

- 40 Wu-yün shan, a prominent peak 1,370 feet (417^m6) high, lies about 12 miles east-south-eastward of Shih-hu-tsui (Lat. 37° 28' N., Long. 120° 25' E.). Ling shan, 1,023 feet (311^m8) high, situated about 8 miles south-westward of Shih-hu tsui, is said to be prominent from northward, as also are two hills, about 600 feet (182^m3) high, lying
- 45 close together about midway between Shih-hu tsui and Ling shan.

- Nearly 4 miles west-south-westward of Shih-hu-tsui is Shih tsui, a point, with a rock lying close off it, rising to a sandhill which has a shrine on it. About 3½ miles further west-south-westward is San shan (Sansan Saddle), a hill, 195 feet (59^m4) high, with a double
- 50 summit, which rises above a point, but a sharp-topped shoulder on the eastern side gives it the appearance of having three peaks; the north-western side of this hill terminates in a cliff, which tapers south-westward one mile to a rocky point, where two small streams flow into the sea, and a village of considerable size is situated at the base of the hill.

Charts 1256, 1262.

Chart 1255.

Ts'ang shan (Hai-miau), 100 feet (30^m5) high, is a remarkable hillock rising abruptly from the plain about 3 miles south-westward of San shan (*Lat.* 37° 24' N., *Long.* 119° 57' E.); there is a village half way up this hill and a temple of a reddish colour on its summit. 6

Lai-chou tui (Lai-chau bank), a spit with depths of less than 3 fathoms (5^m5) over it, extends about 8½ miles north-westward from the coast near Ts'ang shan, and its extremity is marked by a red conical buoy No. 1. The tidal streams set across Lai-chou tui.

Charts 1255, 1256.

Lai-chou wan.—Islet.—Danger.—Lai-chou wan (Lai-chau bay) is entered between a point situated about 3 miles westward of Ts'ang shan and the mouth of Hsiao-ch'ing (Hsiaotsing) ho, situated about 40 miles westward. Southerly winds prevail during spring and summer, and north-westerly winds during autumn and winter. 15

Chart 1255.

Hu-feng tao (Fuyung tau), lying about 3 miles south-westward of the eastern entrance point of Lai-chou wan, is a wedge-shaped islet, 253 feet (77^m1) high, and about one cable westward of it is a small rock 5 feet (1^m5) high. 20

There are several villages on the eastern shore of Lai-chou wan, and the walled town of I-hsien lies about 4 miles inland about 10 miles south-eastward of Hu-feng tao.

Miao shan (Tiger head), 390 feet (118^m9) high, on which there is a prominent shrine, lies about 9 miles southward of Hu-feng tao. 25
Ta-che shan, 2,430 feet (740^m1), which lies about 14 miles south-eastward of Miao shan, is a very prominent sharp peak at the southern end of a mountain range of which it is the highest point.

Charts 1255, 1256.

Lai-chou wan is generally shoal and there are depths of less than 3 fathoms (5^m5) about 5 miles offshore in most places. Sha ho, Chiao (Peichiao) ho, Wei ho, and Pailang ho discharge into the southern shore of the bay; all these rivers, with the exception of Sha ho, which is difficult to enter, are accessible to junks at high water.

Chart 1256.

Yang-chiao-kou and approach.—Beacons.—Buoys.—Yang-chiao-kou (*Lat.* 37° 16' N., *Long.* 118° 52' E.), the port of Chi-nan (Tsinan-fu), the capital of the province of Shantung (*chart 1262*), is situated about 7½ miles within the entrance of Hsiao-ch'ing ho. This river is fronted by a bar situated about 1½ miles outside its entrance, which is only passable at high water, and is marked by two beacons. 35 40

The river is navigable to Yang-chiao-kou; the depths between the bar and Yang-chiao-kou are from 7 to 17 feet (2^m1 to 5^m2), with hard sand bottom. Above Yang-chiao-kou, traffic depends on canals, which have a depth of less than 2 feet (0^m6) in places, and which are frozen in winter. Steamers ply between Yang-chiao-kou and Yen-t'ai. 45

A red conical buoy, No. 3, with a triangular topmark, is moored about 2½ miles north-eastward of the beacons on the bar, and a similar buoy, No. 2, with a square topmark, is moored 4½ miles further in the same direction. 50

Huang ho.—Huang ho or Yellow river rises in Tibet, and has a length of about 2,700 miles; as it has a broad, shallow course liable to change, it is only navigable over comparatively small portions.

Chart 1262.

Chart 1256.

From the city of K'ai-feng (Kai-fung-fu), the capital of the province of Honan (chart 1262), to the sea, a distance of about 350 miles, this great river has no permanent bed, but alternately changes its direction through the great plain northward or southward of the Shantung mountains; it has for ages been kept within vast embankments to prevent the periodic desolation by its inundations.

In the early part of 1854 the river was flowing in a general easterly direction from K'ai-feng, and discharged into the sea in about Lat. 34° N., but later in that year it diverted near K'ai-feng into a northern bed which it had occupied 550 years previously, and discharged into Po hai about 40 miles north-north-westward of the mouth of Hsiao-ch'ing ho. In 1940, the above entrance had entirely disappeared, and Huang ho then entered the sea about 15 miles northward of the mouth of Hsiao-ch'ing ho.

Coast.—Buoys.—From the mouth of Hsiao-ch'ing ho, the coast trends generally north-westward for about 120 miles to the mouth of Hai ho.

In coasting along this shore in hazy weather its appearance is very peculiar, all objects being magnified to an extraordinary extent; small villages appear out of the mist like huge towns and men loom like towers, whilst the shores vanish on either hand in long, finely tapering points.

From the entrance to Hsiao-ch'ing ho (Lat. 37° 18' N., Long. 118° 59' E.), the coast trends northward for about 25 miles before turning generally north-westward. Between the mouths of Hsiao-ch'ing ho and Hsiao-sha ho, situated about 65 miles north-westward, the coast is very low and there are few dwellings. The 3-fathom (5^m5) line is generally about 3 miles offshore in the southern half of this stretch of coast, and is marked by numerous fishing stakes; further northward it gradually extends until it is nearly 10 miles offshore off the entrance to Hsiao-sha ho, and fishing stakes are few. A red conical buoy, No. 4, with a triangular topmark, is moored about 12 miles offshore about 40 miles northward of the entrance to Hsiao-ch'ing ho, and a similar buoy No. 5, lies about 20 miles north-eastward of the entrance to Hsiao-sha ho.

Ta-sha ho and Ma-chia ho discharge about 2½ and 8 miles, respectively, west-north-westward of the entrance to Hsiao-sha ho; the channel leading to the former has depths of 3 to 11 feet (0^m9 to 3^m4), but the latter is only accessible at high water.

Ko-ching ho discharges about 15 miles west-north-westward of the entrance to Hsiao-sha ho. A temple, with a white tower about 50 feet (15^m2) high, stands on a small islet on the eastern side of the entrance to this river, and a chain of islets fronts the coast for a distance of about 6 miles east-south-eastward. Ko-ching ho is accessible to junks drawing 8 feet (2^m4), but the channel is intricate and local knowledge is essential. The channel is marked by buoys which are withdrawn during the winter. A red conical buoy, No. 6, with a triangular topmark, is moored about 10 miles north-eastward of the entrance to Ko-ching ho, and marks the 3-fathom (5^m5) line. There are some fish traps in the approaches to Ko-ching ho and Hsiao-sha ho.

The coast between the mouths of Ko-ching ho and Chieh-chien ho, situated about 26 miles north-westward, is somewhat higher and

Chart 1262.

Chart 1256.

contains a number of scattered villages and isolated trees; this stretch of coast is fronted by numerous fishing stakes from 2 to 4 miles offshore. Chieh-chien ho is fronted by a bar which dries about 3 miles outside its entrance, but it is accessible to junks at high water. A village called Ch'i-k'ou (*Lat. 38° 37' N., Long. 117° 33' E.*) lies on the southern side of the entrance. There are a number of fishing stakes on the northern side of the bar. 5

The coast between the mouths of Chieh-chien ho and Hai ho, situated about 25 miles north-north-eastward, is a low beach of 10 sand and mud. The 3-fathom (5^m5) line is generally about 10 miles offshore all the way between the mouths of To-ching ho and Hai ho; it is marked by a red conical buoy, No. 7, with a triangular topmark, moored about 11 miles east-north-eastward of the entrance to Chieh-chien ho. 15

Chart 1262.

HAI HO.—General remarks.—Hai ho is the name given to the lower reaches of Pei ho between T'ien-ching (Tientsin) and its entrance. This river serves to carry away the waters of a vast region, comprising almost all that part of the province of Hopeh (Hopei) which lies southward of the mountainous region north-westward of Peking (Peiping), and stretches as far as the eastern slopes of the mountains eastward of the province of Shansi and north-eastward of the province of Honan. 20

The tributaries of Pei ho have an extremely varied output; during the three months of July, August, and September the rainfall is sometimes very heavy, causing floods, which may extend over large tracts of country, causing enormous damage. The last disastrous floods occurred in 1871, 1890, and 1917, but in other years quite a number of floods have caused great damage, notably those in 1912 30 and 1939. The most important tributary of Pei ho is Yung-ting (Wen) ho, which joins the river about 10 miles above T'ien-ching, and flows generally from north-westward, passing south-westward of Peking.

In the autumn the quantity of water flowing out of the rivers diminishes quickly on the whole and becomes less in winter, when the ice lasts about three months; it rises again gradually towards the month of March, when the thaw sets in, and the small fall of the winter's snow melts, and then reaches its minimum in May and early June. 40

After the summer rains, the water courses from the mountainous regions have all a decided torrential character, and they carry with them an abundant quantity of matter in suspension; in many cases the moving mass is more a mud than a liquid, and contains as much as 25 per cent. of solid matter. On leaving the mountainous regions the various water courses have raised their beds, by successive additions of alluvial soil, to a height considerably above that of the neighbouring lands. 45

Hai ho may be affected by the breaking of dykes in rivers above T'ien-ching during floods; thus a breach of the dyke of the upper Pei ho, at some 20 miles above T'ung-hsien, the port of Peking, situated 90 miles up Pei ho above T'ien-ching (*Lat. 39° 09' N., Long. 117° 11' E.*), diverted much of the flow of water into rivers which 50

Chart 1262.

Chart 1262.

flow into the sea at Pei-t'ang (page 473), thus depriving Hai ho of a large part of the supply of fresh water from this river which it formerly received.

5 *Charts 2653, 2654.*

In 1897 the Hai ho Conservancy Commission was appointed, and various measures have been adopted for improving the navigable conditions of the river. The course of Hai ho has already been improved by various cuttings which eliminated many bends, thereby
15 reducing the length of the river and making the conditions for the propagation of the tide more favourable.

The depths in the Taku Bar channel have, with the improvement of the river itself, and in later years by dredging, been increased, but in years of heavy floods heavy silting has taken place; this can only
15 be met by making improvements in the system of the tributaries of Pei ho with the object of:—

- (a) Securing a direct outlet to the sea of that portion of the output of the tributaries during heavy floods that Hai ho is not capable of accommodating.
- 20 (b) To reduce as far as possible the menace of silting, which is principally caused by Yung-ting ho.
- (c) To assure to Hai ho as large an output as possible during times of flood subsidence, and the whole output of the tributaries during the dry season.

25 The execution of works towards the attainment of these objects has been entrusted to the Commission for the Improvement of the River System of Hopeh, appointed after the floods of 1917.

Formerly the river was closed to navigation on account of ice from December to February, and sometimes longer, but the improvements
30 already carried out have had excellent results from the point of view of keeping the river open to navigation in winter. With the ice-breakers now in use there is usually no difficulty in keeping the river open as far as T'ien-ching during the months of December and February, and, in a normal winter, this is possible also in January.

35 In 1947 extensive works were in progress on the construction of a new entrance to the river about a mile northward of the existing one; the new entrance is through a channel protected by two breakwaters; the river proper is entered through a lock at the inner end of this channel. See T'ang-ku New harbour, page 462.

40 **Depths.**—The sea level is considerably affected by the direction and force of the wind, easterly winds raising it and northerly winds lowering it. The Hai ho Conservancy Commission endeavour to maintain such a depth in the river that vessels of 13 feet (4^m0) draught can reach T'ien-ching at average high water, which is 8 feet (2^m4)
45 above Taku datum.

In October 1948 the maximum draught permitted was 15 feet (4^m6) at high water.

Navigation.—The following directions were formulated before the construction of the new entrance to the river:—

50 Vessels proceeding to T'ien-ching (*Lat. 39° 09' N., Long. 117° 11' E.*) should arrive at Taku light-vessel (page 460), where the pilot will embark, not less than 3 hours before high water on Taku bar; this will ensure rising water and a flood stream all the way to, and when swinging at, T'ien-ching, except in the freshet season, during

Charts 2653, 2654.

July and August, when there is no flood stream at T'ien-ching. The passage from Taku light-vessel to securing at T'ien-ching should, under these circumstances, take about 5 hours. Vessels proceeding up the river are required by the pilots to have a stern anchor ready for letting go after passing the Entrance light-buoy. 5

Vessels proceeding down river should leave T'ien-ching about 2 hours before high water there ; this ensures the best water around the bad bends. It is advisable to arrange the time of departure with the pilot the day before, and if necessary make a final adjustment on the day of departure, as the tides are irregular. 10

It is considered desirable, if circumstances permit, to swing on arrival at T'ien-ching. If, owing to the traffic in the river, a vessel arrives at T'ien-ching at slack water or at the beginning of the ebb, it may still be possible to swing with the engines alone, provided that the wind is favourable. 15

It is generally the practice for vessels over 300 feet (91^m4) long to remain at T'ang-ku, although the upper turning basin can accommodate a vessel 340 feet (103^m6) long, and the lower turning basin a vessel 325 feet (99^m1) long. 20

As the bed of the river alters frequently, it is advisable to obtain the latest information from the Conservancy Board before making the passage. The Harbour-master at T'ien-ching promulgates information from time to time giving the permissible draught of vessels proceeding to T'ien-ching. 25

Pilots do not undertake the passage up or down the river at night except under the best conditions of moonlight. Passage over Taku bar and anchorage outside the entrance is, however, undertaken under normal conditions at night. 30

For navigation rules, *see* page 466.

Chart 2653.

Taku bar and roadstead.—Taku bar extends about 2½ miles seaward from the mud banks extending about 3 miles from the coast on either side of the entrance to Hai ho ; these mud banks, known as North and South banks, dry and are of a treacherous character, being unfit for landing on when uncovered. Taku roadstead lies seaward of the bar. 35

The land at the entrance to the river is low and flat. North Mound (*Lat.* 39° 00' N., *Long.* 117° 42' E.), which marks the site of the dismantled North Fort, is situated on the northern side of the river entrance. There are several beacons, erected for surveying purposes, on the foreshore northward and southward of the entrance ; the positions of these can best be seen on the chart. Diamond beacon, a black mast with a daymark, is situated on the breakwater under construction on the southern side of the new entrance, and about 2 miles south-eastward of the river entrance ; it is also used for surveying purposes. Taku light-vessel (page 460) is the only good mark for Taku roadstead. 40

The climate in the road during summer is agreeable and healthy, the sea breezes which then prevail tempering the heat ; vessels at anchor are liable to be infected with flying insects with offshore winds. Heavy gales cause an unpleasant sea. In winter, when the weather is very severe, vessels cannot anchor in the road owing to ice. 50

Anchorage.—Vessels awaiting the tide anchor in Taku roadstead

Charts 1256, 1262.

Chart 2653.

according to their draught, taking care to leave the fairway between Taku light-vessel and the entrance to Taku Bar channel clear; there is a depth of 24 feet (7^m3), good holding ground, about 9 miles east-south-eastward of the river entrance.

An explosives anchorage area, circular in shape, and 2 miles in diameter, lies about 13 miles eastward of Hai ho entrance, with its centre in approximate position Lat. 38° 58' N., Long. 117° 59' E. (chart 1256).

- 10 The following information is based on reports received in 1946 and 1947 :—

The area northward and north-eastward of Taku light-vessel is used as an anchorage for all types of vessels. The Port Director assigns anchorage berths by bearing and distance from the light-vessel. The average depth in the anchorage is 8 fathoms (14^m6). During periods of strong onshore winds, the depths, particularly on the bar and in the vicinity of the light-vessel, may be considerably less than charted.

Holding ground is very poor, and it is advisable to allow at least half a mile clearance of all anchored vessels. Winds are strong all year round, and dragging anchor is quite common. Deep draught vessels should not anchor inside the light-vessel. There are numerous submerged wrecks in the anchorage area, which form a hazard for vessels dragging their anchors.

- 20 During winter the anchorage is frozen in. A solid ice field extended more than 50 miles eastward from the charted position of Taku light-vessel during the winter of 1946-47. Ice breakers in the area are relatively ineffective, but the anchorage can be reached without the aid of ice breakers by selecting courses through the thinner ice and by backing and filling when necessary.

Light-vessels.—Fog signals.—Buoyage.—Taku light-vessel is moored about 8 miles east-south-eastward of the tide signal station on the northern side of the entrance to Hai ho and close southward of the line of Taku Bar leading lights (page 461); the vessel is painted red, with a name in white on her sides in Chinese characters, and has a light-tower from which a light is exhibited at an elevation of 35 feet (10^m7). A fog signal is sounded from the light-vessel. A black spar buoy is moored about one cable southward of the light vessel and is used as a watch-buoy for that vessel. During the winter months, this light-vessel is replaced by a vessel with a black hull and white funnel and upperworks, with a name on her sides in Chinese characters. This vessel hoists a black ball by day, and exhibits a light of reduced power; she is liable to be withdrawn on account of weather. A fog signal is sounded occasionally.

- 40 Entrance light-buoy, marking the approach to the channel over the bar, is moored about 6 miles east-south-eastward of the tide signal station (Lat. 39° 00' N., Long. 117° 42' E.) and close northward of the line of the leading lights; this light-buoy exhibits a *white flashing light every three seconds*. From about 1st December to 1st March this light-buoy is replaced by a black spar buoy.

Bar light-boat is moored on the bar about 4 miles south-eastward of the tide signal station and close southward of the line of the leading lights; the vessel has one mast, is painted red, with a name in white on her sides in Chinese characters, and exhibits a light at an

Chart 2653.

elevation of 25 feet (7^m6). A fog signal is occasionally sounded from the light-boat. This light-boat is removed from about 1st December to 1st March, on account of ice, and her position is marked by a black spar buoy.

A black conical buoy, No. 1, and a red conical buoy, No. 2, are moored, respectively, southward and northward of the leading line about midway between Bar light-boat and Entrance light-buoy: two similar buoys are moored nearly half a mile south-westward of the above.

Outer Deep Hole light-buoy, No. 3, painted red and exhibiting a *white flashing* light giving a *short flash every three seconds*, is moored close southward of the line of the leading lights and about 3½ miles east-south-eastward of the tide signal station.

A red conical buoy, No. 4, is moored on the southern side of the leading line about 2½ miles south-eastward of the tide signal station.

Deep Hole black spar buoy is moored nearly 2 miles south-south-eastward of the tide signal station and marks the southern side of Deep Hole.

Spit red conical buoy is moored on the southern side of the fairway about 1½ miles south-south-eastward of the tide signal station; from about the 1st of December to the 1st of March this buoy is replaced by a black spar buoy.

Leading marks for Taku Bar channel.—Lights.—Beacons.—The following are the leading marks for Taku Bar channel; their positions are liable to be moved as necessary to conform with the changes in the channel. The edges of the channel are normally marked by diamond-shaped marks from which *red* lights are exhibited.

Taku Bar leading marks, consisting of two black iron framework beacons with spherical daymarks, are situated southward of the entrance to Hai ho. The front beacon (*Lat. 38° 58' N., Long. 117° 43' E.*) is situated about one cable north-westward of the root of South dike, which lies about 1½ miles southward of the tide signal station, and exhibits a light at an elevation of 46 feet (14^m0); the rear beacon is situated about 7 cables west-north-westward of the front beacon, and exhibits a light at an elevation of 80 feet (24^m4). These two beacons in line, bearing about 281½°, lead from Taku light-vessel to the entrance to Hai ho.

South Dike light is exhibited, at an elevation of 15 feet (4^m6), from a post situated about one cable north-westward of the outer end of South dike; this light is in line with Taku Bar leading lights.

Leading marks for the approach to the entrance of Hai ho are situated on the western side of the entrance to the river, and consist of two black pyramidal beacons. The front beacon is situated about 3 cables south-westward of the tide signal station, and exhibits a light at an elevation of 37 feet (11^m3); the rear beacon is situated about 3 cables north-north-westward of the front beacon, and exhibits a light at an elevation of 53 feet (16^m2). These lights in line bearing 330°, lead from Deep Hole to the entrance of the river.

A light is exhibited at an elevation of 22 feet (6^m7), from a black pyramidal beacon, situated on the ice dike, which extends south-eastward from the northern entrance point of Hai ho, and about 5 cables south-south-eastward of the tide signal station. A light is exhibited, at an elevation of 44 feet (13^m4), from a black pyramidal

Chart 2653.

beacon, situated on the western side of the river, about 8 cables west-north-westward of the above light.

A light is exhibited, at an elevation of 25 feet (7^m6), from a post situated about 3 cables south-westward of the outer end of South dike. A light is exhibited, at an elevation of 40 feet (12^m2), from a post situated about 3 cables westward of the above light.

Tidal streams.—The tidal streams in the Taku Bar channel set in the direction of the channel when the mud flats in the approach to the river entrance are uncovered, but as soon as the flats are covered they set across the channel in a direction approximately parallel to the coast, the stream setting northward on the rising tide at Taku, and southward on the falling tide; the maximum rate is about 2 knots at spring tides and one knot at neap tides.

Depth signals.—Signals indicating the depth in Taku Bar channel are displayed at the tide signal station, situated on the eastern side of the entrance to Hai ho, and also from the Bar light-boat. The tide-signal station and the light-boat use independent means to measure the depth in the channel, and occasionally show a difference of half a foot; there is a tide gauge about 3 cables south-westward of the light-boat. The signals are made by means of black balls and black square shapes by day; at night *white* lights replace the balls and *red* lights replace the shapes. Each ball or *white* light hoisted on the left yard-arm indicates a depth of one foot. Each square shape or *red* light hoisted on the right yard-arm indicates a depth of 5 feet. A square shape nearest the outer end of the left yard-arm and below the foot signal, indicates, by day, an additional half foot; a *red* light near the inner end of the left yard-arm and below the foot signal, is the equivalent night signal. The depth is equal to the sum of the figures represented by the hoists. The Bar light-boat only displays the day signals, and hoists a white flag at the stern in addition for a depth of half a foot.

A black triangle at the masthead of the signal station flagstaff, or a *green* light above a *white* light, indicates a rising tide; an inverted triangle at the masthead, or a *white* light above a *green* light, indicates a falling tide.

At T'ien-ching a rising tide is indicated by a black cone, point upwards, by day, and at night by a *green* light over a *white* light; these signals are shown at the riverside yardarm of the Customs flagstaff on the British bund.

T'ang-ku New harbour.—**Depth.**—**Buoys.**—**Beacons.**—T'ang-ku New harbour is constructed on the northern side of Taku Bar channel, and gives access to Hai ho through a lock at its inner end. This harbour was opened in 1952, and provides considerable berthing accommodation and deep water anchorage for medium size vessels. The extent of the constructional work can best be seen from the chart, but implicit reliance cannot be placed on the positions and alignment of dredged channel and breakwaters, or on the general accuracy of the detail shown.

A light-buoy, painted black and exhibiting a *green flashing* light every three seconds, marks the outer end of the breakwater under construction, and is moved as the work progresses.

The lock giving access to the river is about 600 feet (182^m9) long and 65 feet (19^m8) wide, and has a depth of 16 feet (4^m9) on the sill. It cannot be used in winter when the harbour is frozen.

Charts 1256, 1262.

Chart 2653.

The entrance channel is marked by light-buoys, and was being maintained to a depth of 21 feet (6^m4) in 1953. The southern side of the channel is marked by Nos. 1, 3, 5, 7 and 9 light-buoys, each painted black and exhibiting a *white flashing light every three seconds*. . 5
The northern side by 3 light-buoys, each painted red and exhibiting a *red flashing light every three seconds*. The positions of all these can best be seen from the chart.

The lock was reported to have been completed in 1946, and it was reported, in 1954 that it was in operation. 10

The depth alongside the main wharf was 24½ feet (7^m5) in 1954.

The entrance channel is marked by a pair of leading beacons, which, in line, bear 282°; the front beacon stands about 1½ miles north-eastward of Taku Bar front leading beacon; the rear beacon stands about half a mile west-north-westward of the front beacon. 15
These beacons are each the centre of a group of five placed on a line at right angles to the leading line and about half a cable apart.

The channel leading to the lock is marked by two beacons with diamond topmarks, situated on the western shore of Hai ho, which are 20 in line bearing 294°.

Taku and T'ang-ku.—Taku (*Lat. 38° 58' N., Long. 117° 40' E.*) is situated on the right bank of Hai ho, just within the entrance, and T'ang-ku is situated on the opposite bank, about 2 miles within the entrance; they are the ports of T'ien-ching, and are used by 25 vessels which are unable to reach that city. They are both controlled by the Chinese Maritime Customs and are directly under the Harbour-master, T'ien-ching. T'ang-ku had a population of 15,000, in 1941.

Tidal streams.—The time of high water at T'ang-ku is about 30 1½ hours later than that at Taku bar, and the tidal streams turn in mid-river from one to 1½ hours after local high and low water. From observations made from 10th to 17th October, 1935, it was found that the in-going stream made about 3½ hours before high water at Taku, and the out-going stream about 1½ hours after high water at 35 that place; slack water lasted for about 15 minutes. The maximum rate of the in-going stream was 3 knots, and the maximum rate of the out-going stream was 4 knots.

Harbour facilities.—Supplies.—Communications.—There are numerous wharves at Taku and T'ang-ku, some having a berthage length 40 of over 1,000 feet (304^m8).

T'ang-ku New harbour has a wharf with a berthage of over 2,000 feet (609^m6).

Repairs can be executed at Taku and T'ang-ku, and there is also a Chinese Naval dockyard at T'ang-ku. There is a 30-ton crane avail- 45 able.

A 30-ton and two 10-ton floating cranes are available at T'ang-ku New harbour.

Dry docks are available at T'ang-ku, Taku, and T'ang-ku New harbour; for the dimensions of the largest, *see* Appendix I, page 706. 50
There are several other docks and wet basins, but these are merely excavations in the bank, with mud dams as lock gates.

Large stocks of coal are maintained. The K'ai-luan Mining Administration has a wharf, with a berthage length of about 1,300 feet

Chart 2653.

(396^m2), at T'ang-ku, and there is a coaling berth in T'ang-ku New harbour. Diesel oil is available in limited quantity.

Supplies are available from T'ien-ching. Water is available at 6 T'ang-ku and T'ang-ku New harbour.

There is communication with T'ien-ching by telephone and telegraph, and by cable to Yen-t'ai. T'ang-ku is the terminus of the Peking-Mukden railway.

There is a radio station at Taku ; *see* page 39.

10 **Storm signals.**—Storm signals are displayed from the flagstaff of the Maritime Customs at T'ang-ku.

Charts 2653, 2654.

Harbour regulations for the Port of T'ien-ching.—The following are extracts from the Harbour regulations for the Port of T'ien-
15 ching, in force in 1948 :—

1.—The term "vessel" in these regulations refers to vessels of foreign type.

2.—The control of the Harbour Authorities of the Port of T'ien-ching extends from the ex-Austrian bridge to 3 miles eastward of the
20 2-fathom (3^m7) contour of Taku bar.

3.—The anchorages for foreign-type vessels are :—

(a) For vessels other than those provided for in (b) and (c) :—

At T'ien-ching : from the ex-Austrian bridge to the lower end of the ex-Belgian concession.

25 At T'ang-ku : from the upper end of the China Merchants Steam Navigation Company's wharf to North Mound.

Outside the bar : from the 2-fathom (3^m7) contour to 3 miles eastward of it.

Note.—When the draught of vessels is too deep to proceed
30 through the channel across the bar, or when they have only passengers to land, or a small amount of cargo to handle, they may obtain special permission to remain outside Taku bar on application in writing to the Commissioner of Customs through their agents.

35 (b) For explosives : in Powder reach, T'ang-ku, or outside Taku bar and clear of other shipping.

(c) For Quarantine purposes : outside the Bar.

5.—Swinging berths shall be kept clear of craft in order to be always available for use. Should any of the swinging berths be closed, the
40 following signals will be displayed from a mast situated on the roof of the Hai ho Conservancy Commission's office :—

Upper swinging berth closed : a black diamond by day and a *red* light at night.

Lower swinging berth closed : a black square by day, and a *green*
45 light at night.

6.—Vessels shall moor in accordance with instructions from the Harbour-master, and shall not shift their berths without a special permit, except when outward bound.

7.—Application for berths or for permission to shift berth must be
50 made at the Harbour-master's office at T'ien-ching or at T'ang-ku (Lat. 39° 01' N., Long. 117° 40' E.), according to the anchorage in which the vessel concerned is berthed, and the necessary instructions will be given. If a vessel be instructed by the Harbour-master to shift her berth, she shall do so.

Charts 1256, 1262.

Charts 2653, 2654.

11.—Within the Harbour limits of T'ien-ching a vessel must not leave her berth or attempt to swing round while another vessel is passing through or entering the anchorage.

12.—Vessels navigating this river must proceed at the slowest speed necessary to keep them under command. 8

13.—Vessels arriving at this port and having on board as cargo dynamite or other high explosives, in whatever quantity, loaded shells, more than 100 pounds of gunpowder, any quantity of small-arm cartridges in excess of 100,000 rounds, or any other fixed ammunition of which the aggregate quantity of powder charges exceeds 200 pounds, and vessels having received on board as cargo any of the aforesaid articles, must either anchor outside the Bar clear of shipping, or in Powder reach above T'ang-ku, and remain there until special permission has been granted to discharge or to leave their moorings, and such explosives must be stored in the Government Explosive Godowns off Powder reach if not moved within 48 hours. 10 16

This rule shall not apply to small-arm safety cartridges when carried in a properly constructed magazine so fitted as to admit of its being flooded by a sea-cock operated from the upper deck, in which case the number of such cartridges allowed to be carried is not limited. 20

14.—Every craft, of whatever description, conveying explosives or dangerous or inflammable goods through any part of the port shall display a red flag by day and exhibit a *red* light at night where it can best be seen, and at a height of not less than 12 feet (3^m7) above the highest part of the deck or superstructure. 25

15.—Vessels arriving from an infected port, or having on board a person suspected of having an infectious disease, or on board of which a death has occurred during the voyage from the last port, or if conveying a corpse not accompanied by a medical certificate showing that death was due to a non-infectious disease, shall, on approaching the quarantine anchorage, display flag Q of the International Code of Signals and shall anchor in the quarantine anchorage until the vessel has been inspected by the Port Health Officer, and shall not proceed until pratique has been granted. 30 35

No person shall be permitted to leave or board such vessel without a permit from the Harbour-master or Port Health Officer.

19. Ballast, ashes, refuse, etc., must not be thrown into the river or its approaches. Vessels wishing to discharge ashes or other refuse should display flag Y of the international Code of Signals at the fore truck, when a licensed ash-boat will be sent. 40

20.—No oil of any description shall be discharged into Hai ho or its approaches. No vessel shall wash out double bottoms, tanks, etc., which contain oil, in the river or its approaches. 45

22.—Vessels when passing dredging plant at work in the river are to proceed as slow as is consistent with safety. Localities where such plant is operating are unsafe for vessels proceeding against the current to provide for the passing of other vessels (*see* Article 3 of Navigation rules operative from the Deep Hole to T'ien-ching on page 468). By "dredging plant" is meant all dredgers, pumping stations, barges, tugs, long shoot pipes, floating pipe-lines, etc. 50

23.—The following signals will be exhibited by dredgers operating in Hai ho or on Taku bar :—

Charts 1256, 1262.

Charts 2653, 2654.

By day : a black ball will be displayed on that side of the dredger which is clear for vessels to pass.

5 *At night* : a white light will be exhibited on that side of the dredger which is clear for vessels to pass, and a red light will be shown on the side of the dredger where there is no clear passage. When moored, dredgers will exhibit the ordinary lights prescribed for a vessel at anchor.

25.—The sounding of steam whistles or sirens or the use of other
10 sound signals, except for the purpose of signalling in accordance with the Regulations for Preventing Collisions at Sea, or for the purpose of warning vessels of danger, is strictly forbidden.

26.—All arc lights on board vessels shall be so shaded or screened
riverwards as to avoid embarrassment to navigators. Searchlights
15 shall not be used in such manner as to interfere with navigation.

27.—All vessels shall keep on board a sufficient number of hands to clear and pay out chain and to slacken off mooring lines when steam vessels are passing.

28.—Vessels of all descriptions lying at their moorings must have
20 their anchors buoyed. Should the anchor, chain, or wire in any way obstruct the fairway, it must be shifted or slackened to allow vessels to pass in safety.

29.—Vessels shall not discharge timber into the waters of the Harbour without special permission from the Harbour-master, and
25 any timber so discharged must not be allowed to accumulate in such manner as to obstruct the fairway.

30.—Vessels lying moored at wharves where the depth of water is less than the draught of the ship do so at their own risk.

31.—No merchant vessel shall fire cannon or small-arms within the
30 waters of the port. Men-of-war are requested not to fire salutes within the T'ien-ching anchorage.

33.—In case of fire occurring on board a vessel in port the fire bell must be rung immediately by that vessel and by those above and below her, and the signal N H of the International Code displayed by
35 the vessel on which the fire has occurred, if possible, and by those above and below her, during the day, or a light lowered and hoisted continuously at night. Notice should be given to the Harbour office immediately.

Navigation rules.—The provisions of the Regulations for Preventing
40 Collisions at Sea are operative in Hai ho and its approaches, except in so far as they are modified by the Special Navigation Rules given below.
Chart 2653.

The following are extracts from rules which are operative on Taku Bar channel for a distance of $2\frac{1}{2}$ cables on either side of the centre
45 line of the channel from $1\frac{1}{2}$ miles seaward of the Entrance light-buoy (Lat. $38^{\circ} 56' N.$, Long. $117^{\circ} 51' E.$) to the Deep hole :—

2.—All vessels, awaiting the rise of the tide, must anchor as follows :—

Incoming-vessels : well clear of the channel entrance.

50 Outgoing vessels : between a line drawn south-westward from the North Mound, situated on the eastern side of the entrance to Hai ho, and a line drawn east from the Taku Tug and Lighter Company's premises, situated on the western side of the entrance ; or in the Deep hole.

Charts 1256, 1262.

Chart 2653.

Masters and pilots are to take every precaution, when anchoring in the Deep hole, not to obstruct the view of the Taku Bar leading marks, and they should not anchor in a position which will interfere with navigation or dredging operations. 5

3.—Vessels must not attempt to pass through the channel until the tide signals show a depth corresponding to or greater than the actual draught of such vessels.

4.—On approaching the channel, steam vessels and tug 10 must give one long blast on the whistle. Should any of the tugs or dredgers engaged in the channel work reply by a succession of short blasts from their whistles, or exhibit a red flag, the channel is not on any account to be entered. Vessels which have been so warned will be informed by signal as 15 soon as the channel is navigable. Both the master and pilot concerned will be held responsible for any infraction of this rule.

5.—Should a vessel ground in the channel, the master or pilot must report in writing to the Harbour-master without 20 delay, specifying bearings of known objects, time of grounding, draught of vessel, depth of water signalled at the time of grounding, etc., and must take prompt steps for lightering if called upon to do so. Lighters are to be placed on the side furthest from the centre of the channel, weather permitting, 25 and must be promptly shifted or removed at the request of the Channel Officer. Anchors must not be laid out in the channel unless absolutely necessary, and, if laid, they are to be buoyed; vessels may be called upon to remove such anchors if they in any way obstruct the traffic. 30

6.—Tugs towing lighters and other vessels of light draught should endeavour to keep on the northern or southern sides of the Bar channel, leaving the centre line for vessels of deeper draught.

7.—Steam vessels and tugs, while in the channel, must main- 35 tain a distance of not less than $2\frac{1}{2}$ cables when following one another, must keep well clear of the dredging plant in the channel and must conform with any signals from such vessels.

8.—In fog, mist, snow, or heavy rainstorms, vessels proceeding across the bar should immediately reduce their speed, 40 stop or anchor, due regard being given to the danger of navigating a restricted channel with poor visibility.

9.—Vessels when in danger of sinking must not use the main channel, but are to be navigated towards the river mouth on the lee-side bank of the channel. 45

Charts 2653, 2654.

The following are extracts from rules which are operative from the Deep hole to T'ien-ching :—

Article 2.—When two vessels are meeting, other than as provided for in Article 3, each shall, when it is safe and practicable, keep to 50 that side of the channel which lies on the starboard side of such vessel.

Note.—In the case of a light-draught and a deep-draught vessel meeting, mutual safety may in some circumstances be best secured

Charts 1256, 1262.

Charts 2653, 2654.

by each vessel keeping to her port side of the channel. Such action in such circumstances is intended to come under the operation of the exception provided for by the qualification "when it is safe and practicable".

Article 3.—A vessel proceeding against the current, when meeting a vessel proceeding with the current, shall provide for the passing of the other vessel in a locality where such passing is safe, slowing down and acting in accordance with Article 2, or stopping and tying up to, or stopping and lying up against either bank, as may be necessary to that end. When it is safe for the other vessel to pass, she shall sound three long blasts.

Note.—The term "tying up" means that the vessel is made fast to the shore. The term "stopping and lying up against the bank" means that the vessel is as close to the bank as possible and that she is not materially moving over the ground.

Article 4.—A vessel proceeding with the current, when meeting a vessel proceeding against the current, shall proceed at the lowest speed consistent with her being kept under command, and particularly shall endeavour to keep back until the other vessel indicates that it is safe to pass by giving three long blasts.

Article 5.—When two vessels are meeting, the sound signal as provided for in Article 8, indicating the side of the channel they intend to follow, is invariably to be made. A vessel stopping and lying up against the bank shall also make this signal.

Article 6.—As regards a vessel overtaking another vessel:—

- (a) The overtaking vessel shall sound one long blast, meaning "May I pass?"
- (b) The overtaken vessel shall respond to such request by sounding either the acquiescence or negative signal, i.e.:—

Acquiescence signal: three long blasts, meaning "Come on, you may pass", and shall indicate which side of the channel she intends to follow by means of sound signals (a) or (b), Article 8.

Negative signal: five or more short blasts, meaning "Keep back, danger, you cannot pass."

- (c) Should the overtaken vessel give the acquiescence signal, she shall slow down to the lowest speed consistent with her being kept under command, and the overtaking vessel shall proceed at no greater speed than is needed to effect the passing with safety.

Article 7.—A vessel proceeding with the current shall, by day, display at the fore-truck one black ball, and at night shall exhibit a green light not less than 6 feet (1^m8) above the masthead light.

Article 8.—The following sound signals are to be used when the meaning attached to them is required to be conveyed:—

- (a) One short blast, "I am keeping to that side of the channel which lies on my starboard hand."
- (b) Two short blasts, "I am keeping to that side of the channel which lies on my port hand."
- (c) Three short blasts, "My engines are going full speed astern."
- (d) Five or more short blasts, "Keep back, danger, you cannot pass."
- (e) One long blast by a vessel having the right of way, "I am proceeding," and made by an overtaking vessel, "May I pass?"
- (f) Three long blasts, "Come on, you can pass."

Charts 1256, 1262.

Chart 2654.

The following are extracts from the rules operative for vessels proceeding to, or leaving, berths in the upper limits of T'ien-ching harbour above the International bridge (*Lat. 39° 08' N., Long. 117° 12' E.*):—

Article 10.—All vessels proceeding above the International bridge shall be fitted with a stern anchor, lifted by adequate machinery, of sufficient size and weight to enable the vessel to be brought up sharply, and such stern anchor shall be ready for immediate use.

Article 11.—Vessels must in all cases pass through the International bridge against the current; masters and agents should, therefore, arrange the time of arrival or departure accordingly.

Article 12.—All vessels intending to proceed above the International bridge shall display, where best seen, flag Z of the International Code of Signals by day, and show a *red* light over a *green* light at night, and sound a prolonged blast on the whistle when passing the Native Customs station in Everlasting reach. Such flag or lights are to be shown until the vessel arrives at her destined berth.

Article 13.—Should a departing vessel be under way and proceeding to pass through the bridge, the following signal will be exhibited on the signal mast at the lower end of the ex-German bund:—

By day: a black and white semaphore arm in a horizontal position.

At night: a *red* light.

Incoming vessels observing such signal should proceed with caution, or moor temporarily at the berth alongside the signal mast, until the semaphore arm is lowered, or a *green* light is exhibited at night, indicating "The bridge is open, you may proceed."

Article 14.—For vessels intending to depart from berths above the International bridge the following signals will be exhibited from the signal mast on the bund at the end of the Rou de Takou:—

By day, a black and white semaphore arm in a horizontal position, or, *by night*, a *red* light, indicates "Bridge not clear, remain at your berth".

By day, the semaphore arm lowered, or, *by night*, a *green* light, indicates "Bridge all clear, you may proceed."

These signals must be strictly obeyed to avoid collision.

Article 15.—No two vessels proceeding in opposite directions shall pass through the bridge at the same time.

Article 16.—Vessels should not overtake or attempt to overtake any other vessel in the section of the river lying between the International bridge and the French Consulate.

Article 17.—Vessels are prohibited from mooring in the section of the harbour situated on the Hotung side opposite the Osaka Shosen Kaisha wharf, i.e.: on the concave side of the first bend below the bridge. The upper and lower limits of this prohibited area are defined by notice boards.

Vessels will, however, be allowed to moor temporarily in this prohibited area if awaiting the opening of the International bridge.

Article 19.—If for any reason the bridge cannot be opened, the following signals will be exhibited simultaneously from the signal mast at the ex-German bund, the Rue de Takou, and the bridge:

By day: a red semaphore arm in a horizontal position.

At night: three *red* lights disposed vertically.

Charts 1256, 1262.

Charts 2653, 2654.

Traffic signals.—At T'ang-ku, a vessel showing a black ball over a code pendant is indicating her intention of swinging above the custom-house. If the code pendant is over the black ball, she will
 5 swing below the custom-house. The same signals on a vessel at T'ien-ching indicate her intention of using the upper or lower swinging berths, respectively.

The signal station at the end of Everlasting reach shows the following signals :—

- 10 A cone, point up, indicates that a vessel is ascending the river. A cone, point down, indicates that a vessel is going down-stream. A ball below the cone indicates that the vessel is a tug with tow.

A vessel arriving in sight of the signal station and seeing a signal indicating traffic in the opposite direction must not negotiate the
 15 turn until the vessel indicated has passed. If two vessels travelling in opposite directions come into the reaches simultaneously, the signal station will give the right of way to the one travelling with the current.

The night equivalent of the above signals is a *red* light for the ball, 20 and a *green* light for the cone (no indication of direction).

Chart 2653.

Regulations for the lock in T'ang-ku New harbour.—The following are extracts from rules which were in force in 1948 :—

Article 2.—Vessels intending to pass through the lock should
 25 carefully note the following signals, which will be displayed from a flagstaff standing on top of the Lock Office northward of the lock :—

(1) International Code signal flags TF, or two vertically disposed *white* lights by night, signifies that the lock is available for the vessel to enter, and that the vessel may proceed at slow speed.

30 (2) International Code signal flags HA, or a *red* and a *white* light, vertically disposed, at night, signifies that the lock is not ready for the vessel to enter, and that the vessel should not approach.

Article 3.—When two or more vessels intend to enter the lock, signal flags representing the names of the vessels will be displayed by
 35 the Lock Office, and the vessels should enter the lock in the order directed by the signal flags.

Article 4.—Before a vessel approaches the lock, she should anchor at the given anchorage to await the Harbour Officer and tug.

Article 5.—Vessels carrying dangerous goods are not permitted to
 40 enter the lock.

Article 6.—All vessels passing through the lock should obey orders from the Lock Officer.

Article 7.—The vessel will be held responsible for making good any damage which may be caused by negligence of orders from the
 45 Lock Officer, or through the fault of the ship's officers and crew.

Article 8.—The Lock Office reserves the right to refuse any vessel passage through the lock for reasons of weather or other causes.

Chart 2654.

Port signals.—The following special signals, by flags of the Inter-
 50 national Code of Signals, are in use at the port of T'ien-ching, in addition to those given on page 32:—

Signal	Meaning
Flag Y	Ash boat wanted
Flag O	Coolies wanted

Charts 1256, 1262.

Chart 2654.

<i>Signal</i>	<i>Meaning</i>	
Flag L	Customs Officer wanted	
Flag Z	Vessel is to proceed through the International bridge	5
Flag U	Tug wanted (for Tug and Lighter Company)	
Flag W	Tug wanted (for Messrs. Butterfield and Swire)	

Chart 2653.

Pilotage.—In 1947 pilotage was compulsory for all vessels, including warships. The pilot station is at Taku, on the right bank and a short distance within the entrance. The pilot embarks between Taku light-vessel and Entrance light-buoy. It is considered advisable to notify the Taku Pilot Association by radio of the expected time of arrival. The visual signal for a pilot, by day, is flags PT of the International Code of Signals; by night, a red light over a green light, not more than 6 feet (1^m8) apart. Pilots will in some cases take vessels in at night. 10 15

Ice-breaker service.—Signals.—During a normal winter the ice-breaker maintained by the local authorities is generally successful in keeping Hai ho open to navigation as far as T'ien-ching. The severest ice conditions usually occur in January. 20

During the ice season, the prevailing conditions, together with information of an urgent nature, are broadcast by the ice-breaker.

Vessels desiring the services of a pilot during the ice season should telegraph to "Pilots, Taku," stating the probable time of their arrival off Taku; arrangements will then be made to have a pilot on board an ice-breaker to await the vessel's arrival off the bar. 25

A vessel requiring the assistance of an ice-breaker should make the following signals:—

By day: A pendant with two balls beneath it; also a succession of one long and three short blasts on the whistle or siren. 30

By night: Three lights, white, red, white, disposed vertically and not less than 6 feet (1^m8) apart; also a succession of one long and three short blasts on the whistle or siren. 35

When the fairway is blocked by drifting bank-ice or other causes, the ice-breaker or ice-breakers which are in the locality will show the following signals:—

By day: The International Code flag N at the masthead.

By night: Five short flashes by searchlight. 40

On observing these signals, vessels should keep back and wait until either of the following signals, indicating the channel is clear, is exhibited:—

By day: The International Code flag N lowered.

By night: Three long flashes by searchlight. 45

An ice-breaker will, if necessary, lead the way in and will signal any instructions that may be necessary. Vessels must keep at such a distance away from the ice-breaker as will eliminate all danger to the ice-breaker in the event of that vessel being suddenly brought to a stop. The following signals will be used by the ice-breaker:— 50

<i>Signal</i>	<i>Signification.</i>
One short blast .	I am altering my course to starboard.
Two short blasts .	I am altering my course to port.
Three short blasts .	My engines are going astern.

Chart 2653.

<i>Signal</i>		<i>Signification</i>
5	One long blast .	(a) <i>from the following steamer</i> —Can I pass ahead of you ?
		(b) <i>from the ice-breaker</i> —You are requested to pass ahead of me.
	Three long blasts .	Come on.
	Five short blasts .	Keep back.

Ice signals for Taku and Po hai.—Caution.—Vessels navigating in this area are requested to report to other vessels passed en route what ice conditions have been encountered. The signals used are the numerals of the Morse code, made by sound, signal lamp, or flag hoist, in which dots are represented by any square flag, and dashes by any pendant.

If signals are made by sound or signal lamp, they should be repeated several times while the vessels are passing.

Ice conditions at Taku bar are indicated as follows :—

<i>Signal.</i>		<i>Signification.</i>
20	One	No ice.
	Two	Ice conditions favourable.
	Two, three	Ice conditions favourable, but becoming difficult.
25	Three	Ice conditions difficult.
	Three, two	Ice conditions difficult, but becoming more favourable.
	Three, four	Ice conditions difficult, becoming very difficult.
30	Four	Ice conditions very difficult.
	Four, three	Ice conditions very difficult, but becoming more favourable.
	Four, five	Ice conditions very difficult, likely to be impracticable.
	Five	Ice conditions impracticable.

Ice conditions in Po hai are indicated as follows :—

<i>Signal.</i>		<i>Signification.</i>
35	Six	As for one.
	Seven	As for two.
	Seven, eight	As for two, three.
40	Eight	As for three.
	Eight, seven	As for three, two.
	Eight, nine	As for three, four.
45	Nine	As for four.
	Nine, eight	As for four, three.
	Nine, ten	As for four, five.
	Ten	As for five.

Low-powered vessels are warned not to approach or leave the Port of T'ien-ching when the signal is " Difficult " (Number three) ; high-powered vessels when the signal is " Difficult, becoming very difficult " (Numbers three, four).

50 Chart 2654.

T'ien-ching.—T'ien-ching (*Lat. 39° 09' N., Long. 117° 11' E.*) is the nearest seaport to Peking, which is distant about 80 miles. In 1952 the population was 1,795,000. T'ien-ching is the principal trading port and distributing centre of North China.

Charts 1256, 1262.

Chart 2654.

Harbour facilities.—Supplies.—Communications.—There are 38 berths alongside the bunds at T'ien-ching, capable of accommodating vessels up to about 300 feet (91^m4) in length; practically all vessels are aground at half tide, but the bottom is soft mud. 6

Cargo is handled by ships gear, and the facilities are adequate. Tugs are available for berthing.

Minor repairs can be undertaken.

There are several hospitals.

Fresh provisions are plentiful; there is a good water supply. 10

A large supply of coal is kept in stock, and can be loaded at the rate of 40 tons per hour.

T'ien-ching is connected to the general railway, telegraph and telephone systems. There is regular communication by sea with Shang-hai and other Chinese ports, and with ports in Japan. There is 15 a radio station, *see* page 39.

Consuls.—There are British Consuls-General at T'ien-ching and Peking.

Climatic tables.—*See* Chapter I, pages 75 and 76.

*Chart 1256, plan of Approaches to Taku.***NORTHERN SIDE OF PO HAI.—Hai ho to Ta-ch'ing ho.** 20

General remarks.—From the entrance to Hai ho, the shore of Po hai trends generally eastward for about 55 miles to the mouth of Ta-ch'ing (Tatsing) ho, which marks the south-western extremity of the area included in Liao-tung wan. This stretch of coast is entirely 25 low and it is intersected by several streams.

Coast.—Anchorage.—Chin-chung ho flows out about 7½ miles northward of the northern entrance point of Hai ho, the coast between being low and covered with tombs, except the middle part, which is mostly a swamp. Chin-chung ho is approached over a shallow bar, 30 and thence through a narrow channel between mud flats which dry.

The village of Pei-t'ang, which is connected to the railway system, is situated on the southern side of the river entrance. From a cursory examination, in 1901, the river for about 5 miles above the 35 entrance was found to have a depth of not less than about 3½ fathoms (6^m4) in the middle of the channel, the banks on both sides being fairly steep-to. Open anchorage can be obtained about 10 miles off the entrance to Chin-chung ho, in a depth of about 3½ fathoms (6^m4).

The coast between the mouth of Chin-chung ho and the entrance 40 to Tou (Chien) ho, situated about 16 miles north-eastward, is fronted by a mud bank which dries out for about 2 miles. The coast between the entrance of Tou ho and the mouth of Ta-ch'ing ho, situated about 38 miles eastward, is fronted by Sha-lei-t'ien tui described below.

Islands and dangers.—Light.—Caution.—Sha-lei-t'ien tui (Shalui- 45 tien banks), which dry, extend from 7 to 12 miles from the coast between the mouths of Tou ho and Ta-ch'ing ho, and must be approached with great caution. There is no open channel between them and the mainland, but there are passages, used by small junks, between some parts of the banks. The south-western edge is fringed 50 by irregular shoal patches, and sounding gives some warning to a vessel approaching on this side, when within a depth of 6 fathoms (11^m0); good anchorage, sheltered from north-easterly gales, can be

Chart 1256, plan of Approaches to Taku.

obtained off this side of the banks, where a chain of fishing nets are reported to be laid. The south-eastern edge of Sha-lei-t'ien tui is steep-to.

- 5 Sha-lei-t'ien (Shaluitien) tao, situated just within the south-eastern corner of Sha-lei-t'ien tui and about 18 miles south-westward of the mouth of Ta-ch'ing ho, consists of low, weed-covered sand dunes, liable to shift or be washed away; there is reported to be a small pagoda somewhere on this island. Ko-t'o, a similar but smaller
10 island, lies about 6 miles north-eastward of Sha-lei-t'ien tao, with several other similar formations between, including Pehkouto.

A light (*Lat.* $38^{\circ} 56' N.$, *Long.* $118^{\circ} 31' E.$) is exhibited, at an elevation of 42 feet (12^m8), from a black framework beacon, 44 feet (13^m4) in height, near the south-western end of Sha-lei-t'ien tao.

- 15 Depths of 2 fathoms (3^m7) were reported, in 1947, about 7 miles southward of Sha-lei-t'ien tao.

With a strong south-easterly wind caution is necessary to avoid being driven too near Sha-lei-t'ien tui.

- Tidal streams.**—Along the southern side of Sha-lei-t'ien tui, the
20 tidal stream set west-north-westward during the rising tide, and south-eastward during the falling tide, with maximum rates of $4\frac{1}{2}$ and 3 knots, respectively, at spring tides. On the western side of the banks the tidal stream sets northward with the rising tide and the rate is less.

- 25 **Ta-ch'ing ho entrance.—Islands.—Beacons.—Buoy.**—The entrance to Ta-ch'ing (Tatsing) ho is fronted by drying mud banks extending about 4 miles offshore. The outer end of the entrance channel between the mud banks lies about one mile eastward of Yüeh-t'o, an islet 17 feet (5^m2) high, situated about 18 miles north-eastward of
30 Sha-lei-t'ien tao. Shih-chiu-t'o, an island 19 feet (5^m8) high, on which there is a prominent tree, lies between Yüeh-t'o and the coast north-north-westward. Ta-wang-kang, an islet 15 feet (4^m6) high, on which there is a prominent building, lies on the outer edge of the drying bank, about 5 miles east-north-eastward of Yüeh-t'o.

- 35 A beacon, with a black conical buoy situated about one mile eastward of it, lies about 4 miles south-westward of Yüeh-t'o. A beacon, with a triangular topmark, lies on the outer edge of the drying bank about $1\frac{1}{2}$ miles north-eastward of Ta-wang-kang; three similar beacons are situated on the mainland eastward of the river entrance;
40 their positions can best be seen from the chart. No attempt should be made to enter the river without local knowledge.

*Chart 1256.***WESTERN AND NORTHERN SIDES OF LIAO-TUNG WAN.**

Ta-ch'ing ho to Liao ho.—General remarks.—From the entrance to

- 45 Ta-ch'ing ho (*Lat.* $39^{\circ} 12' N.$, *Long.* $118^{\circ} 51' E.$), the shore of Liao-tung wan trends generally north-eastward for about 150 miles before turning eastward to curve gradually round to the entrance to Liao ho, which lies about 50 miles east-south-eastward. This shore is low for about the first 30 miles from Ta-ch'ing ho, but is then backed by
50 hills of moderate elevation until it starts to turn eastward at the head of the gulf, where there is an extensive low plain.

The port of Ying-k'ou (Yingkow), situated at the mouth of Liao ho, is described on page 504. Ch'in-huang-tao (Chinwangtao)

Chart 1262.

Chart 1256.

and Hu-lu-tao (pages 476 and 484) are the only other ports of importance on this section of the gulf.

Coast.—Anchorage.—About 13 miles north-eastward of the mouth of Ta-ch'ing ho is Ch'ou-shui k'ou, a creek in an extensive swamp which is more or less covered at high water ; further south-westward large plains of sand and mud extend from 6 to 8 miles inland and present a desolate appearance. The mirage on this part of the coast is very deceptive, the dry sand having the appearance of water, whilst objects are considerably distorted, small huts appearing on first sight to be large forts.

Lao-mi k'ou, a former mouth of Luan ho (*see* below), which it joins about 25 miles upstream, is situated at the northern end of the extensive swamp at Ch'ou-shui k'ou ; it is no longer navigable.

Luan (Lwan) ho discharges about 23 miles north-eastward of the 15 entrance to Ta-ch'ing ho. Between the entrances of Lao-mi k'ou and Luan ho the coast is fronted by a sand bar about one mile offshore which is almost submerged at high water, and through which there are several entrances ; junks can enter at high water and find shelter behind this sand bar. Shali chiao, situated at the entrance to Luan 20 ho (*Lat.* 39° 29' N., *Long.* 119° 14' E.) is the southern extremity of a ridge of sandhills, about from 100 to 150 feet (30^m5 to 45^m7) high, which extend along the coast for about 22 miles northward ; this point must be given a berth of at least 3½ miles. Luan ho is fronted by a bar which dries about 1½ miles outside its entrance. Junks can 25 enter at high water, and the river is navigable by small boats for about 30 miles. There are fishing stakes off the river entrance. A large lagoon, which dries, lies about one mile inland, and its entrance is about 10 miles northward of Shali chiao ; the 3-fathom (5^m5) line extends about 5 miles offshore abreast its entrance. Yin-ma (Pu) 30 ho flows out about 17 miles northward of Shali chiao and drains a somewhat swampy flat ; it enters the sea through a gap in the sandhills, and the bar off the mouth dries. Offshore at the mouth there is an exposed anchorage. Ch'ang-li shan, 2,288 feet (697^m4) high, situated about 11 miles north-westward of Yin-ma ho entrance, is 35 prominent and is the only good landmark in the vicinity.

Yang ho flows out about 6 miles northward of the mouth of Yin-ma ho and about one mile north-eastward of the northern end of the sandhills ; the entrance over the bar is very shoal, and there is exposed anchorage off the mouth. Tai ho flows out about 2 miles 40 north-eastward of Yang ho, and the bar is very shallow.

Chart 3378.

Liu-chuang mao-ti.—Light.—Liu-chuang mao-ti (Peitaiho anchorage), lies westward of Chin-shan (Kinshan) tsui, which is situated about 4 miles eastward of the mouth of Tai ho and has a white square 45 light-tower on its summit, from which a light is occasionally exhibited ; shoal water extends about 2 cables from the point.

Legation point, on which are some bungalows and a flagstaff, is situated nearly one mile westward of the light-tower on Chin-shan tsui. Liu-chuang village is situated about one mile westward of 50 Legation point and is connected by rail to the main Peking-Mukden line ; the land in the vicinity is cultivated to the foot of the mountains about 4 or 5 miles inland. All the hills in the vicinity are wooded. Tung-lien-feng shan, comprising three peaks situated

Chart 3378.

about $3\frac{1}{2}$ miles west-north-westward of Chin-shan tsui, is 510 feet (155^m4) high and very prominent.

The region westward of Chin-shan tsui was formerly a summer resort for foreigners known as Pei-tai-ho hai-pin (beach), and contains many large prominent western-style buildings.

In 1934 H.M.S. *Cumberland* anchored about $1\frac{1}{2}$ miles southward of Legation point, in a depth of 5 fathoms (9^m1), sand and mud, with the light-tower on Chin-shan tsui bearing 039°, and a prominent white cupola situated nearly $1\frac{1}{2}$ miles westward of Legation point bearing 314°; soundings taken at the time showed that there were depths of from 4 to $5\frac{1}{2}$ fathoms (7^m3 to 10^m1) around this position. The white cupola is hidden by hills when within a distance of about three-quarters of a mile offshore. In 1935 H.M.S. *Falmouth* anchored with the flagstaff on Legation point bearing 337°, distant half a mile, in a depth of 3 fathoms (5^m5), blue clay, very good holding ground.

In 1939 H.M.S. *Lowestoft* found sheltered anchorage with this flagstaff bearing 050° distant one mile. There is a small stone break-water close southward of a prominent hotel and about $1\frac{1}{2}$ miles westward of Legation point, where landing can be effected: other landing places are in a sandy cove on the western side of Legation point and at a cove close eastward of the breakwater.

Ch'in-huang-tao wan.— **Danger.**— **Anchorage.**— Ch'in-huang-tao (Chinwangtao) wan, situated between Chin-shan tsui and Ch'in-huang-tao (Chinwangtao) chiao (*Lat. 39° 55' N., Long. 119° 37' E.*), lying about 7 miles north-north-eastward, is sufficiently steep to allow boats to land easily. A one-fathom (1^m8) shoal lies about $2\frac{1}{2}$ miles north-north-eastward of Chin-shan tsui.

Hsiao-tung shan and Ta-tung shan are rocky points situated, respectively, about half a mile and one mile northward of Chin-shan tsui. A prominent temple stands at the end of some cliffs, lying about half a mile north-westward of Ta-tung shan. T'ang ho, which flows into the northern part of the bay about 2 miles westward of Ch'in-huang-tao chiao, is a mountain torrent and is not navigable; there is a quicksand at its entrance. Hsiao ho (Hsiaoho-tze) discharges close westward of T'ang ho.

Ch'in-huang-tao wan affords good anchorage in depths according to draught; the bottom is thick black mud, good holding ground. In 1928 H.M.S. *Magnolia* anchored in the southern part of the bay, in a depth of about 4 fathoms (7^m3), with the light-tower on Chin-shan tsui bearing 215°, and a two-storied villa on a hill about three-quarters of a mile northward of the light-tower bearing 270°; a good landing place was found on a sand and shingle beach westward of this anchorage.

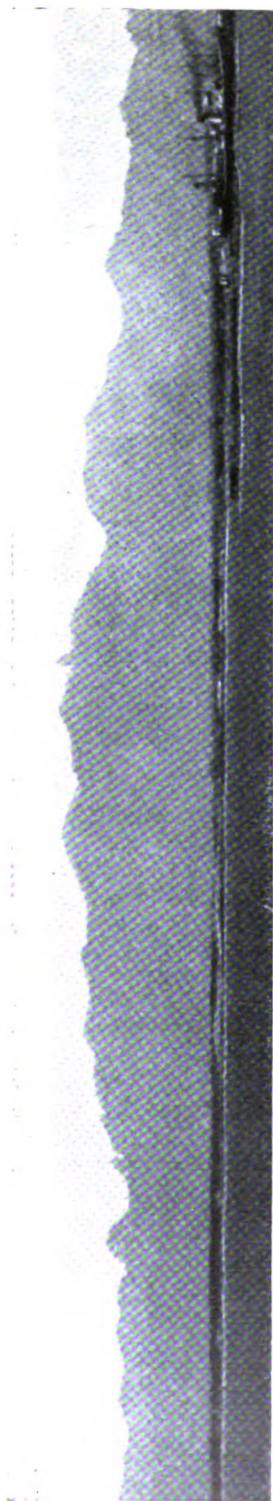
Chart 3378, plan of Chinwangtao road.

Ch'in-huang-tao.— **General remarks.**— **Aspect.**— Ch'in-huang-tao (Chinwangtao), situated in the northern part of Ch'in-huang-tao wan, which is known as Ch'in-huang-tao (Chinwangtao) road, is the coaling port of the K'ai-luan Mining Administration. The port possesses advantages over the ports of Ying-k'ou and Taku in that ice conditions are less severe, depths are greater and less subject to change, and large vessels can berth at the wharves.

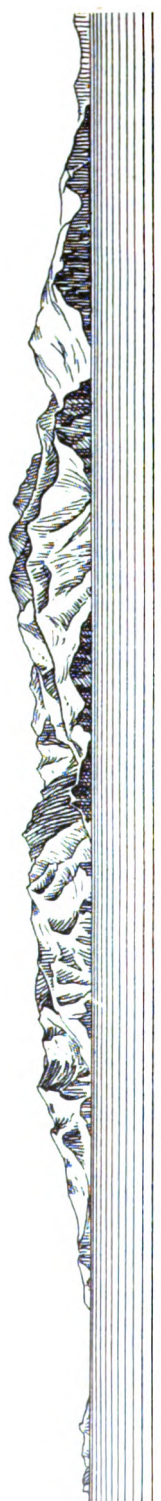
The coast in the vicinity of Ch'in-huang-tao is not easily identified but Lao-hua chien, also known as Thumb peak, about 4,400 feet

Charts 1256, 1262.

*Lao-hua chien,
(Thumb Peak)*



*Ch'in-huang-tao (Chinwangtao) road,
(Original dated 1932).*



*Lao-t'ieh-shan-ki chiao
(Lau-ti-shan promontory)
Lighthouse not shown.*

*Kuan-tung pan-tao (Kwangtung peninsula).
(Original dated 1830).*

*Hai-mao tao (Kailuo tao),
from south-westward, 11 miles.*

Chart 3378, plan of Chinwangtao road.

(1,314^m1) high, situated about 15 miles north-north-westward of Ch'in-huang-tao chiao and near the summit of the western of two mountain ranges rising a few miles inland, is a good mark when approaching from south-eastward; *see* view facing this page. If Lao-hua chien is obscured, the bluffs at Chin-shan tsui will be the first objects to be identified.

The Bluff, of which Ch'in-huang-tao chiao is the south-eastern extremity, is a low, rocky promontory terminating southward in cliffs from 50 to 60 feet (15^m2 to 18^m3) high, and fringed by rocks which dry out about one cable. A short distance within these cliffs the land dips and then rises again to Haze hill, which is conical and sandy, and is situated on the northern part of the promontory; this hill has an elevation of 88 feet (26^m8) and a water tower stands on it. The land for about a mile within the promontory is a flat, sandy plain with occasional sand dunes, but further inland it is well cultivated and thickly populated. A water tower stands nearly 2½ cables north-westward of Haze hill. Two other water towers stand about one cable and 3½ cables west-north-westward of Haze hill, the western one being 75 feet (22^m9) high; a conspicuous house stands nearly midway between these two water towers. The buildings and chimneys of Yua-hua glass works, situated in the town, are reported to be good landmarks. Chih yen, a rock 6 feet (1^m8) high, lies close off the western side of The Bluff

Light.—A light is exhibited at an elevation of 105 feet (32^m0), from a circular stone tower on Ch'in-huang-tao chiao (*Lat.* 39° 55' N., *Long.* 119° 37' E.).

Ice.—Generally speaking, it is only after a calm of a week's duration in winter that ice forms at Ch'in-huang-tao, and the most that has been observed there was from 6 to 8 inches thick, extending about a mile offshore. In January and February north-easterly winds may bring down a large amount of drift ice from the head of Liao-tung wan; if followed by easterly and south-easterly winds the ice may be blown inshore, and under pressure then becomes a considerable hindrance to navigation. In March 1933, after a considerable period of north-easterly winds, the ice field extended for a distance of 40 miles from Ch'in-huang-tao, and H.M.S. *Sandwich* experienced some difficulty in forcing her way through; from 25 to 40 miles offshore the field contained many large blocks of discoloured ice, dangerous to navigation, and it would have been inadvisable for a vessel to attempt to pass through this at night. In January 1936, during one of the most severe winters on record, the ice field extended 50 miles offshore, and the approach to and departure from Ch'in-huang-tao was difficult for any but high-powered vessels.

Ch'in-huang-tao harbour.—**Pier.**—**Breakwater.**—**Depths.**—**Shoal.**—**Directions.**—The harbour lies between a pier and a curved breakwater which extend from the south-western end of The Bluff, and it affords accommodation for vessels up to 600 feet (182^m9) in length; as the bottom is very soft vessels may ground with safety. As a result of dredging operations there was a least depth of 28 feet (8^m5), in 1946, on or near the leading line in the approach channel.

There is a berth, 400 feet (121^m9) in length for one vessel on each side of the outer end of the pier, and there are five berths alongside the breakwater, from 300 to 420 feet (91^m4 to 128^m0) in length.

Charts 1256, 1262.

Chart 3378, plan of Chinwangtao road.

No. 1 berth is on the north-western side of the pier, and No. 2 berth is on the south-eastern side of the pier; the depth alongside these berths are 20 and 21 feet (6^m1 and 6^m4), respectively. No. 7 is the
 5 outer berth on the north-western side of the breakwater, and the remainder run in decreasing numerical order along that side to No. 3; No. 7 berth is 600 feet (182^m9) long, and the total length of berthage is about 2,000 feet (609^m6). The depth alongside Nos. 5 and 7 berths is 28 feet (8^m5), alongside No. 6 berth 29 feet (8^m8), No. 4 berth
 10 26 feet (7^m9), and No. 3 berth 22 feet (6^m7).

A shoal, with a depth of 3 fathoms (5^m5) over it, lies about 2 cables north-eastward of the outer end of the breakwater.

A jetty extends south-south-westward from the western side of the slipway at the head of the harbour, and its eastern side is available
 15 for boats at all states of the tide. A tide-gauge, 12 feet (3^m7) in height, painted black and white in horizontal bands, stands about half a cable south-eastward of the extremity of the jetty; a rock awash lies close north-westward of the tide-gauge.

Vessels making for the berths alongside the breakwater should
 20 steer in with the breakwater nearly end on, keeping the wharves close aboard. The anchor on the side of the vessel away from the berth must be stowed inboard.

Lights.—Beacons.—A light is exhibited, at an elevation of 44 feet (13^m4) from the head of the pier at Ch'in-huang-tao harbour, and
 25 another, at the same elevation, from the head of the breakwater; the latter is difficult to identify when approaching the harbour, as it merges with the bright lights on the pier. The ordinary lights for illuminating the breakwater are reported to be conspicuous when approaching the harbour at night.

30 Leading beacons are erected at Ch'in-huang-tao. The front beacon (Lat. 39° 55' N., Long. 119° 36' E.) is situated near the beach about 6½ cables north-north-westward of the light on the head of the pier, and is a red diamond; the rear beacon is situated nearly half a mile northward of the front beacon and is a white diamond. These
 35 beacons in line, bearing 352°, lead towards the entrance of the harbour. It has been reported that these beacons are somewhat inconspicuous.

The lights and beacons at Ch'in-huang-tao are maintained by the K'ai-luan Mining Administration.

40 **Pilotage.**—Pilotage is carried out by the K'ai-luan Mining Administration and is compulsory for merchant vessels of over 500 tons. There is no recognised pilotage ground, but the vessels are usually picked up about 1½ miles outside the breakwater.

It was reported, in 1950, that 24 hours' notice of the time of arrival
 45 must be given, and that the port does not normally function at night.

Signals.—Vessels must not attempt to enter the harbour unless they are instructed to do so by signal or otherwise; if no signals are made, vessels must anchor clear of the fairway into the harbour.

By day, signals are made to vessels by the International Code of
 50 Signals from the signal station at the southern end of The Bluff.

At night vessels approaching the harbour and wishing to berth must sound one long and one short blast on their whistles, when one of the following signals will be made from the signal station on The Bluff:—

Chart 3378, plan of Chinwangtao road.

1.—One *green* light at the masthead, meaning "Stand by to come alongside."

2.—One *red* light at the masthead, meaning "Anchor."

Tidal streams.—The ebb stream appears to sweep round Ch'in-huang-tao wan and sets across the entrance to the harbour; vessels must, therefore, guard against being set on to the breakwater.

Southward of The Bluff the tidal streams set west-south-westward during the rising tide, and east-south-eastward during the falling tide, at a maximum rate of half a knot.

Outer anchorage.—The best anchorage for large vessels is about three-quarters of a mile southward of the breakwater, with the pier and breakwater lights in line, bearing about 359° , in depths of from 4 to 5 fathoms (7^m3 to 9^m1). Small vessels can anchor westward of the pier and breakwater, where smooth water may be found with strong north-easterly winds.

There is also good anchorage about 2 miles south-eastward of the breakwater, in a depth of 6 fathoms (11^m0); or closer in, with Lao-hua chien (*Lat.* $40^{\circ} 07' N.$, *Long.* $119^{\circ} 28' E.$) in line with the end of the breakwater, bearing 328° , distant about three-quarters of a mile from the latter, in a depth of about 5 fathoms (9^m1). When anchored southward of the harbour, however, the swell is said to frequently make work difficult.

It was recommended, in 1950, that vessels arriving during daylight hours should anchor 3 miles, and, during the night, 10 miles, outside the port area.

Town.—The native town, situated northward of the Peking-Mukden railway, had, in 1933 a normal population of about 20,000; the greater part of the land southward of the railway is occupied by K'ai-luan Mining Administration, and in 1933 had a population of about 5,000.

Harbour facilities.—Supplies.—Communications.—Cargo can be discharged into railway trucks at either the pier or breakwater. Small repairs can be undertaken. A small patent slip is available. There are two 10-ton and three 5-ton mobile cranes. A tug is available.

There is a well equipped hospital belonging to the K'ai-luan Mining Administration, and there is also a Chinese isolation hospital.

A large stock of coal is maintained, and can be loaded from the wharves at the rate of 100 tons per hour.

Fresh provisions are obtainable. Water can be obtained alongside, or from water boats; in 1946 it was reported to be unfit for drinking.

Ch'in-huang-tao is connected to the Chinese railway system and to the telegraph system. There is regular communication by sea with Hong Kong and Shang-hai.

Chart 3378.

Coast.—The coast between Ch'in-huang-tao chiao and Shih-ho pi, situated about $8\frac{1}{2}$ miles eastward, is clear of dangers and the beach is steep-to; a cultivated plain extends to the foot of the mountains, which lie 4 to 5 miles inland and rise to an elevation of about 2,000 feet (609^m6). Hsin-k'ai ho and Hsiao ho discharge, respectively, close north-eastward and about 5 miles east-north-eastward of Ch'in-huang-tao chiao. A shoal with depths of 3 fathoms (5^m5) or less over it, extends about a mile southward from Shih-ho pi. Shih ho flows out westward of this point.

Chart 3378.

Lin-yü (Shanhaikwan) is a walled city situated about 4 miles north-westward of Shih-ho pi.

The Great Wall of China has its eastern extremity near Ning-hai, a village situated about one mile north-north-eastward of Shih-ho pi ; it rises generally to a height of from 20 to 30 feet (6^m1 to 9^m1), and with a thickness of from 15 to 25 feet (4^m6 to 7^m6). From Ning-hai the wall trends generally north-westward towards Lin-yü, of which it forms the north-eastern city wall, and then north-north-westward over the coastal plain to disappear from view behind a ridge of the mountain range in the background. The towers on the wall at regular intervals are often visible when the wall itself cannot be seen.

Anchorage.—Anchorage can be obtained off Ning-hai with offshore winds, in a depth of about 4 fathoms (7^m3), thick, mud, good holding ground ; closer in the bottom is sand, and in depths of less than 2 fathoms (3^m7) it is rocky. Northerly and easterly winds appear to raise the level of the water, and south-westerly winds to lower it ; a high level of the water appears to precede a north-easterly gale by about 18 hours, and for some days afterwards the level of the water may be abnormally low.

During south-westerly winds landing can generally be effected on the beach under the lee of Shih-ho pi (*Lat.* 39° 57' N., *Long.* 119° 48' E.), provided the boats can get in far enough, but there is a heavy surf during north-easterly winds, although this subsides quickly after the wind abates ; it is stated to be always calm in the early morning.

Coast.—Dangers.—Huan-hai-ssu-ti (Huanhaishihti) tsui, situated about 6½ miles east-north-eastward of Shih-ho pi, is cliffy and 55 feet (16^m8) high ; it is bordered by rocks to a distance of about a quarter of a mile offshore, and a rock drying 4 feet (1^m2) lies about 4 cables east-north-eastward of its north-eastern extremity. There are two pagodas on Huan-hai-ssu-ti tsui. Chiang-hü-fen, 74 feet (22^m6) high and prominent, lies nearly one mile south-westward of the summit of Huan-hai-ssu-ti tsui, and there is foul ground between this rock and a point about one mile westward.

Chart 1256.

Northward of Huan-hai-ssu-ti tsui the land is mountainous a few miles from the coast, the ranges running north-eastward far beyond the head of the gulf. Although appearing from a distance as continuous ranges, many are distinct groups, separated by extensive plains, whilst their marked and peculiar forms render them useful landmarks. Nan shan, 1,356 feet (413^m3) high, is a double peak situated about 13 miles northward of Huan-hai-ssu-ti tsui and about 10 miles inland ; about 3 miles further north-north-eastward is San shan, a sharp peak 2,351 feet (716^m6) high, and Tahu shan, 2,137 feet (651^m4) high, lies about 3½ miles northwards of San shan. Li-tzu-shan ting (Litze shan), 2,141 feet (652^m6) high, situated about 8 miles north-north-eastward of Tahu shan, has a long shoulder running eastward, at the end of which is a spur.

Charts 3378, 1256.

The coast between Huan-hai-ssu-ti tsui and T'uan-shan chiao, situated about 27 miles east-north-eastward, is low, and is fronted by a shorebank with depths of less than 3 fathoms (5^m5), which extends

Chart 1262.

Charts 3378, 1256.

nearly 2 miles in places; within the coast is an undulating plain about 10 miles broad, and there are several towers a few miles inland. Immediately north-eastward of Huan-hai-ssu-ti tsui, there is an open bay named Chih-mao wan.

Chart 1256.

A conspicuous white building stands amongst trees near the coast about 3 miles westward of T'uan-shan chiao, and a reef lies about half a mile off a point situated about $1\frac{1}{2}$ miles further westward.

San-tao sha (banks) consists of banks of coarse sand extending nearly 10 miles southward from T'uan-shan chiao; there is a least depth of 5 feet (1^m5) on the central part of these banks, and they are usually marked by a long line of breakers even in moderately fine weather. There is a swashway, from half a mile to about $1\frac{1}{2}$ miles wide, with a least depth of about 8 fathoms (14^m6), through the outer part of the banks. Vessels should, however, pass well outside the banks, in depths of not less than 13 fathoms (23^m8), mud; a sandy bottom indicates their proximity, and the nearer the banks, the cleaner the sand.

Tidal streams.—The tidal streams set northward along the coast during the rising tide, and south-eastward during the falling tide; they turn earlier near the coast than in the offing. The tidal streams are strong over the shallows.

Coast.—Islet and dangers.—Anchorage.—The coast between T'uan-shan chiao and Tung-niang-ting (Tungliangting) chiao, situated about 6 miles north-north-eastward, is low and sandy, and is fronted by a flat which dries out about one mile off Tung-niang-ting chiao. About $2\frac{1}{2}$ miles north-westward of T'uan-shan chiao (*Lat.* $40^\circ 12' N.$, *Long.* $120^\circ 27' E.$), is a smooth round hill, 185 feet (56^m4) high, which has a large granite quarry on its southern side; Lo-t'o shan, lying nearly 3 miles northward of T'uan-shan chiao is 267 feet (81^m4) high, and a pile of granite boulders on its summit has the appearance of a ruined tower; about 3 miles northward of Lo-t'o shan, is a hill 205 feet (62^m5) high, which has a double summit on the northern of which is a group of temples. These three isolated hills are excellent landmarks, and appear as islands when first sighted. A small river flows out about 2 miles north-eastward of T'uan-shan chiao, and another river named Liu-ku ho flows out at Tung-niang-ting chiao. There are depths of only $2\frac{1}{2}$ fathoms (4^m6) in places about 2 miles offshore between T'uan-shan chiao and Tung-niang-ting chiao.

The coast between Tung-niang-ting chiao and Ch'ang-shan-ssu (Changshansze) chiao, situated about 7 miles north-north-eastward, is indented by a shallow bay; there are undulating brown hills, from about 70 to 100 feet (21^m3 to 30^m5) high, along its shores, and several low cliffy points, with rocks off them, alternate with small valleys fronted by sandy beaches. Ch'ang-shan-ssu chiao rises to a hill about 160 feet (48^m8) high; foul ground extends nearly $1\frac{1}{2}$ miles eastward from this point, and it should not be approached to a depth of less than 5 fathoms (9^m1). There are numerous small villages in its vicinity.

Hsiao-hai-shan tao, lying about one mile north-eastward of Ch'ang-shan-ssu chiao and on the edge of the drying coastal bank, is 149 feet (45^m4) high, covered with scrub, and steep-to on its seaward side; a reef, with a rock 2 feet (0^m6) high on its outer end, extends about 6

Chart 1262.

Chart 1256.

cables north-eastward from the northern point of this island. Hsiao-hai-shan tao lies off the entrance to Ch'ang-shan-ssu wan, the northern entrance point of which is about 2 miles northward of
 5 Ch'ang-shan-ssu chiao; this bay is almost entirely encumbered by mud flats which dry, except for a small area, with depths of from 7 to 9 feet (2^m1 to 2^m7), between Ch'ang-shan-ssu chiao and Hsiao-hai-shan tao.

The coast between the northern entrance point of Ch'ang-shan-ssu wan and Nan-hsing-ch'eng (Nansingcheng) chiao (*Lat.* $40^\circ 29' N.$, *Long.* $120^\circ 39' E.$), lying about $5\frac{1}{2}$ miles north-north-eastward, is low and is fronted by a mud bank which dries out to about one mile offshore. About $3\frac{1}{2}$ miles north-westward of Nan-hsing-ch'eng chiao is Chien shan, a sharp peak, 539 feet (164^m3) high, with a
 15 square shoulder on its southern side, and close to the coast about one mile westward of this point is a hill 330 feet (100^m6) high.

The coast between Nan-hsing-ch'eng chiao and Pei-hsing-ch'eng (Peisingcheng) chiao, situated about 9 miles north-eastward, is marshy, except for the first three miles, and is unapproachable on
 20 account of the drying flats, named Hsing-ch'eng-p'ing chou, which extend as much as 3 miles offshore. Mao yen (Cat rock), a black rock 26 feet (7^m9) high, lies on this flat and nearly 3 miles north-north-eastward of Nan-hsing-ch'eng chiao; a rock, 6 feet (1^m8) high, lies about one mile southward of Mao yen.

25 Small vessels with local knowledge can obtain anchorage, in depths of about 3 fathoms (5^m5), about 2 miles eastward of Pei-hsing-ch'eng chiao. There is a landing place at this point.

Table mountain, 1,674 feet (510^m2) high, situated about 20 miles west-north-westward of Nan-hsing-ch'eng chiao, is flat-topped, with
 30 precipitous sides, and about $2\frac{1}{2}$ miles north-eastward of it is a mountain 1,821 feet (555^m0) high. About $12\frac{1}{2}$ miles westward of Nan-hsing-ch'eng chiao is Lo-ku shan, a hill with a double summit, 707 feet (215^m5) high, divided by a deep cleft. Hei-feng shan 1,330 feet (405^m4) high, is situated about 9 miles north-north-westward
 35 of Nan-hsing-ch'eng chiao, with a ridge of steep hills between them; the highest part of this ridge, nearly 3 miles south-eastward of Hei-feng shan, is a double peak 1,061 feet (323^m4) high, with a peculiar mark down the side of its western summit. The high ranges northward of Hei-feng shan are difficult to identify, but a mountain,
 40 1,080 feet (329^m2) high, situated nearly 3 miles north-westward of Pei-hsing-ch'eng chiao, is steep, symmetrical, and has a tower on its summit between two shoulders.

Off-lying islands and dangers.—Chang-chia tao, lying about 5 miles south-eastward of Nan-hsing-ch'eng chiao, is 182 feet (55^m5) high and
 45 saddle-shaped and is steep-to except for some rocks which extend about 4 cables northward from its northern point. Another islet, 143 feet (43^m6) high, lies about $1\frac{1}{2}$ miles northward of Chang-chia tao (*Lat.* $40^\circ 27' N.$, *Long.* $120^\circ 46' E.$), and the passage between it and the rocks which extend northward from Chang-chia tao has irregular
 50 depths of from $2\frac{1}{2}$ to 6 fathoms (4^m1 to 11^m0), sand.

Chü-hua (Chuhwa) tao lies with its southern extremity about $5\frac{1}{2}$ miles eastward of Nan-hsing-ch'eng chiao; this island appears to be much further offshore than is actually the case, as the land between Nan-hsing-ch'eng chiao and Pei-hsing-ch'eng chiao is too low to be

Chart 1262.

Chart 1256.

visible from a distance. Chū-hua tao is divided into two parts by a low, narrow neck of land; the hills in the south-western part attain an elevation of 600 feet (182^m9), and those in the north-eastern part an elevation of 648 feet (197^m5). The southern side is bold, and in some places precipitous. A long, narrow shoal, with a least depth of one foot (0^m3) over it, lies about one mile off the eastern side of the island and nearly parallel to it. A shoal, with a least depth of 4½ fathoms (7^m8) over it, lies about one mile southward of the south-eastern point of the island. The northern extremity of Chū-hua tao is a headland, 90 feet (27^m4) high, connected to the island by a narrow neck of sand. Mo-p'an shan, with a flat summit 74 feet (22^m6) high, and cliffs all round, lies about three-quarters of a mile north-eastward of this headland; Sail rock, close off the northern side of Mo-p'an shan, is 54 feet (16^m4) high. A bank, which dries, extends as much as one mile from the western side of Chū-hua tao, and is almost joined to the coastal bank.

Armytage reef, which dries 6 feet (1^m8), lies about 3½ miles eastward of Mo-p'an shan and is steep-to, with depths of from 5 to 6 fathoms (9^m1 to 11^m0) around; Chang-chia tao bearing 229°, and open its own breadth south-eastward of Chū-hua tao, leads close south-eastward of this reef. A rock, with a depth of 3 feet (0^m9) over it, on which the sea sometimes breaks, lies nearly 1½ miles northward of Armytage reef; a rock, which dries 2 feet (0^m6), lies about 1½ miles further northward. In calm weather there are tide-rips around these rocks. There are depths of over 5 fathoms (9^m1) between Armytage reef and the shoal which lies about one mile off the eastern side of Chū-hua tao.

Coast.—Dangers.—Hunter point, situated about 3 miles north-north-eastward of Pei-hsing-ch'eng chiao, rises to a steep, rugged range of hills, 776 feet (236^m5) high, the summit of which, named Chia shan, is broken by a ravine, with a partially ruined tower on the outer part. Lien-shan wan, a bay with a sandy beach at the head, lies immediately northward of Hunter point. Between the north-eastern entrance point of this bay and Hu-lu-tao kao-chiao, situated about 7 miles east-north-eastward, the coast is bordered by steep hills, on the western of which is a low tower.

Chart 2653, plan of Hulutao harbour.

Hu-lu-tao kao-chiao (promontory) is the outer extremity of a narrow peninsula which extends about 4 miles eastward from the general line of the coast, and is divided near its centre by a low isthmus; the outer part is from 300 to 400 feet (91^m4 to 121^m9) high, and the inner part rises to a height of 534 feet (162^m8) at Ma-an shan. Hu-lu-tao chiang, described below, lies on the southern side of the peninsula, and a large area northward of the isthmus was being reclaimed in 1944. The southern end of Hu-lu-tao kao-chiao (*Lat.* 40° 43' N., *Long.* 121° 01' E.) is a round headland or bluff, about 400 feet (121^m9) high, named Teng-lung shan; several rocks lie close off its southern side, including one 78 feet (23^m8) high. Foul ground extends about 6 cables eastward from Hu-lu-tao kao-chiao, and on its eastern end lies Ta-chiu-lou (Tatsiulow), a reef which dries up to 6 feet (1^m8) and on the southern end of which is a rock 2 feet (0^m6) high; an isolated 7 foot (2^m1) patch, lies about 1½ cables south-eastward of the 2-foot (0^m6) rock.

Chart 1262.

Chart 2653, plan of Hulutao harbour.

A shoal, with a least depth of 3 fathoms (5^m5) over it, lies about 1½ miles south-south-eastward of Hu-lu-tao kao-chiao.

Light.—A light is exhibited, at an elevation of 423 feet (128^m9), 5 from a white circular concrete tower, 33 feet (10^m1) in height, on Teng-lung shan.

Hu-lu-tao chiang.—**General remarks.**—**Harbour facilities.**—Hu-lu-tao chiang (harbour) extends from Hu-lu-tao kao-chiao to Wang-hai-sso (Wanghaisze) chiao, a point situated about 3½ miles west-south- 10 westward; the harbour limits are indicated by pecked lines on the chart.

An artificial harbour, enclosed by a breakwater, lies southward of the outer part of the peninsula, and was still under construction in 1944. At that time the eastern end of the works in progress at the 15 breakwater was marked by a buoy. Details of the harbour works and of dredged areas inside the harbour can best be seen from the chart.

The point on the northern side of the harbour about three-quarters of a mile westward of Hu-lu-tao kao-chiao is called Shi-tzu t'ou.

Vessels can berth alongside the quay wall at the western end of the 20 harbour, or at two piers extending eastward from this wall. A total of over 5,000 feet (1,524^m0) of berthing space is available, with depths of from 19 to 30 feet (5^m7 to 9^m1) alongside. There is also a tanker berth on the northern side of the breakwater.

Most of the berths are served by rail, and a 2-ton floating crane is 25 available. Fresh water is laid on to all the berths. A pilot is available.

During the spring and summer the prevailing winds are southerly to south-westerly, moderate to fresh in strength; occasionally, in summer, easterly winds are experienced and, if they attain much 30 strength, vessels alongside are obliged to proceed to an anchorage.

The winter is severe for a short period, ice commencing to form about the third week in December and before the month closes the harbour is usually frozen over until the beginning of March, being open to shipping again about the second week of that month.

35 Hu-lu-tao is connected to the Peking-Mukden railway.

Light.—**Radio D.F. station.**—A light is exhibited, at an elevation of 28 feet (8^m5), from a white square steel structure, 33 feet (10^m1) in height, on the head of the breakwater at Hu-lu-tao chiang.

A radio D.F. station is situated about 11 cables west-north- 40 westward of the lighthouse.

Chart 1256.

Chin-chou wan.—Chin-chou (Chinchow) wan, entered between Hu-lu-tao kao-chiao (*Lat.* 40° 43' N., *Long.* 121° 01' E.) and a point situated about 7 miles north-north-eastward, is divided into two parts 45 by a hilly point, 334 feet (101^m8) high, with a tower on it. The entire bay is shallow, and mud flats dry out as much as 2 miles off-shore.

Chart 2653, plan of Hulutao harbour.

Kuei shan, an islet 61 feet (18^m6) high, with a 39-foot (11^m9) rock close eastward of its southern extremity, lies about 6 cables west- 50 north-westward of the northern extremity of the peninsula terminating in Hu-lu-tao kao-chiao.

Chart 1256.

T'ien-ch'iao-ch'ang (Tienkiaotsang), the seaport of Chin-chou (Chinchow), is situated on the northern shore of the bay. Chin-chou

Chart 1262.

Chart 1256.

is situated about 15 miles northward of T'ien-ch'iao-ch'ang and about 10 miles up Hsiao-ling (Siaoling) ho.

Pi-chia shan lies about one mile southward of the northern entrance point of Chin-chou wan, and is connected to it by a ridge of sand and shingle, which dries; this island has four round hills on it, the highest being 252 feet (76^m8) high, and the stratification is laid bare along their western faces by landslips. A rock, which dries 2 feet (0^m6), lies about 8 cables eastward of the northern point of the island.

Hsiao-kuei shan, a small island 88 feet (26^m8) high, lies about 2 miles northward of Pi-chia shan, and stands on the edge of the drying coastal bank over half a mile offshore.

Coast.—Banks.—The coast for about 4 miles northward of the northern entrance point of Chin-chou wan consists of a sandy beach; thence for another 4 miles north-eastward it is cliffy, with hills close inland. Hai-wan shan, the highest of these hills, is situated about three-quarters of a mile within the coast and about 6 miles north-north-eastward of Pi-chia shan and is 537 feet (163^m7) high and prominent.

Hsiao-ling (Siaoling) ho enters the gulf through some earth cliffs about 5 miles north-north-eastward of Hai-wan shan; its narrow bed takes a southerly course through the mud flats, but it is only navigable for boats.

From the entrance to Hsiao-ling ho, the coast trends generally eastward for about 25 miles to the entrance to Ta-ling ho, and then recedes to form a deep indentation, into which several other rivers discharge, before turning south-eastward to the entrance to Liao ho.

At the head of Liao-tung wan is an extensive plain; the coast is low, and mud flats, with long lines of fishing stakes on them, dry out from 3 to 5 miles between the entrances of Hsiao-ling ho and Ta-ling ho.

Drying banks, which are intersected by channels leading to the river entrances, extend about 20 miles south-south-eastward from the entrance to Ta-ling ho. Kai-chou tui (Kaechu tai), a bank which dries 10 feet (3^m0), lies at the southern end of these banks, with its southern extremity about 10 miles westward of the entrance to Liao ho.

EASTERN SIDE OF LIAO-TUNG WAN.—General remarks.

From Lao-t'ieh-shan-hsi chiao (page 451), the eastern shore of Liao-tung wan trends generally north-north-eastward for about 120 miles to the entrance to Liao ho. It is indented near its southern end by a large bay named Kuan-tung (Kantō) wan, and is generally somewhat hilly until within about 15 miles of Liao ho.

The port of Ying-k'ou, situated at the entrance to Liao ho, is described on page 504. The only other port of any importance is P'u-lan-tien chiang (Furanten kō), situated in the north-eastern corner of Kuan-tung wan.

Chart 1798.

Lao-t'ieh-shan-hsi chiao.—Light.—Fog signal.—Lao-t'ieh-shan-hsi chiao (Liau-ti-shan promontory) is the south-western extremity of Kuan-tung pan-tao (Kwantung peninsula) and the eastern entrance point of Liao-tung wan; see view facing page 477. Two white beacons, 24 feet (7^m3) in height, are situated on this point, and are in line bearing 119°. The coast eastward of Lao-t'ieh-shan-hsi chiao is described in Chapter XIII.

Chart 1262.

Chart 1798.

A light is exhibited, at an elevation of 315 feet (96^m0), from a white circular iron tower, 49 feet (14^m9) in height situated on Lao-t'ieh-shan-hsi chiao. A fog signal is occasionally sounded from the light-
5 station. See view below.



*Lao-t'ieh-shan-hsi chiao
Lighthouse bearing 345°.
(Original dated 1943)*

Coast.—Island and dangers.—The coast between Lao-t'ieh-shan-hsi chiao (*Lat. 38° 44' N., Long. 121° 08' E.*) and Chang tsui, (Choso) a point situated about 3½ miles north-north-westward, is fairly steep-
10 to, with depths of over 10 fathoms (18^m3) about a quarter of a mile offshore; rocks and reefs extend about 3 cables westward from Chang tsui, and there is a tidal race off the point.

Chiu (Yoto) wan is entered between Chang tsui and Ta-yang t'ou (Taiyoto), a steep-to point, 470 feet (143^m2) high, situated about 2½ miles northward. A promontory 233 feet (71^m1) high, is situated
15 at the head of the bay and divides it into two smaller bays; the northern of the two is shallow, but it affords shelter to junks from the strong northerly and north-westerly winds which prevail in this locality. The point situated about one mile south-eastward of Ta-yang t'ou is called Erh-yang t'ou (Niyoto). Chiu wan affords
20 anchorage, but it is exposed to westerly winds.

The coast between Ta-yang t'ou and a point about 2½ miles northward is fringed by a steep-to shoal which extends from one to 2½ cables offshore. Shuang-tao (So-tau) wan is entered between the latter
25 point and Ta-hu tsui (Taikoso), situated about 2½ miles north-north-westward; a rock awash lies about 4 cables west-north-westward of the southern entrance point, and another rock awash lies about 4 cables northward of this point. Shuang tao (So tau), an island 143 feet (43^m6) high, lies in the middle of the bay and about one mile within the entrance; the portion of the bay eastward of this island is
30 shallow, and most of it is occupied by a sandbank, which dries, but small vessels can obtain anchorage westward of Shuang tao, although it is entirely open westward.

Hsi-hu tsui (Sai-ko point), situated about one mile northward of Ta-hu tsui, is cliffy and steep-to; a shoal with depths of less than 3
35 fathoms (5^m5) over it, extends about a quarter of a mile from the coast between these two points. The coast at Hsi-hu tsui is 637 feet (194^m2) high, and about one mile northward of the point it is 587 feet (178^m9) high. About 2½ miles north-north-eastward of Hsi-hu tsui is the northern entrance point of a shallow bay; Shan-tzu shih
40 (Ogi Ishi), an islet 79 feet (24^m1) high, lies about a quarter of a mile north-westward of this point, with a reef between.

Hudson point is situated about 1½ miles east-north-eastward of Shan-tzu shih (*Lat. 38° 57' N., Long. 121° 06' E.*).

Tidal streams.—The tidal streams along the coast between Lao-
45 t'ieh-shan-hsi chiao and Hsi-hu tsui run approximately northward and

Charts 1392, 1256, 1262.

Chart 1798.

southward. The south-going stream runs from about $2\frac{1}{2}$ hours before to about 4 hours after high water at Inch'ön (Admiralty Tide Tables Standard Port). The stream runs northward from about 4 hours after high water until about $2\frac{1}{2}$ hours before the next high water. 5
The maximum rate off the point is from 3 to $5\frac{1}{2}$ knots, and tide races occur off Chang tsui and Hsi-hu tsui.

Off-lying islands and dangers.—Light.—Hai-mao tao (Kaibyo tau) is 377 feet (114^m9) high and lies with its eastern extremity nearly 3 miles south-westward of Ta-hu tsui. A reef, having some rocks which 10
dry 2 feet (0^m6) on its outer end, extends about 3 cables south-westward from the south-western point of Hai-mao tao, and a rock which dries, 7 feet (2^m1), lies about 4 cables westward of the island; there are strong eddies westward of this rock.

Hsiao-lung-shan tao (Sho-ryu shan), situated about 5 miles north- 15
north-westward of Hai-mao tao, has a somewhat flat summit and clifly coasts; it is 715 feet (217^m9) high and steep-to, except for a shoal which extends about one cable from its southern extremity.

A light is exhibited, at an elevation of 182 feet (55^m5), from a white circular concrete structure, 25 feet (7^m6) in height, situated on the 20
north-western extremity of Hsiao-lung-shan tao.

Charts 1798, 2833.

Kuan-tung wan.—General remarks.—Anchorage.—Kuan-tung wan (Kwantung bay) is entered between Hudson point and Ta-jen (Ta-zhunn) shih, situated about 27 miles northward, and its inner part 25
is divided into two by a rocky promontory; Chin-chou wan (Kinchau bay), in the south-eastern corner, is separated from the northern part of Ta-lien (Dairen) wan by a neck of land about 2 miles across; P'u-lan-tien chiang, situated in the north-eastern corner, is an extensive inlet. The depths in the bay, excluding the inner parts, are from 30
about 3 to 8 fathoms (5^m5 to 14^m6), and vessels can anchor almost anywhere, but the whole bay is open westward; small vessels can anchor under the lee of the various islands in the bay.

Chart 1256.

Banks in the approach to Kuan-tung wan.—A number of banks, 35
with depths of from $5\frac{1}{2}$ to 10 fathoms (10^m1 to 18^m3) over them, are situated in the western approach to Kuan-tung wan; for their positions the chart should be consulted.

Charts 1798, 2833.

Islands and dangers.—Heng chou (Hung cho), a bank with depths of 40
from 4 to 5 fathoms (7^m3 to 9^m1) over it, lies on the southern side of the entrance to Kuan-tung wan, and extends about 3 miles north-eastward from a position about 3 miles north-eastward of Hudson point (*Lat. $38^\circ 57' N.$, Long. $121^\circ 08' E.$*).

Chu tao, 242 feet (73^m8) high, lies about 8 miles northward of 45
Hudson point and is inhabited; there is a small bay on its southern side which is reported to afford shelter to boats with northerly winds. A shoal with depths of less than 3 fathoms (5^m5) over it, extends about $3\frac{1}{2}$ cables southward from the south-eastern extremity of Chu tao, and on the outer end of this shoal is Huang-shih (Hung-shih) 50
chiaio, a rock which dries 3 feet (0^m9). Hsiao-ping t'o-tzu (tautze), a rock 45 feet (13^m7) high, lies about half a mile north-westward of Chu tao, and a rock, which dries 5 feet (1^m5) lies about a quarter of a mile northward of this island. Chang chou (cho), a bank with depths

Chart 1262.

Charts 1798, 2833.

of from $3\frac{1}{2}$ to 5 fathoms (6^m4 to 9^m1) over it, extends about 7 miles north-north-eastward from a position about 3 cables northward of Hsiao-ping t'o-tzu. Miao-mu tao (Mao-niu tautze), an islet 143 feet
5 (43^m6) high, lies about 4 cables eastward of Chu tao; Kai-yang chiao, 5 feet (1^m5) high, lies about a quarter of a mile northward of Miao-mu tao and is connected to it by a reef.

Hu-p'ing (Huphing) tao, 186 feet (56^m7) high, lies about $1\frac{1}{2}$ miles east-north-eastward of Kai-yang chiao; Tung-chuan shih, a rock
10 36 feet (11^m0) high, lies on a shoal which extends about 2 cables eastward from Hu-p'ing tao. Hsi-chuan shih, a rock 30 feet (9^m1) high, lies about half a mile westward of Hu-p'ing tao; foul ground extends about 6 cables westward from Hsi-chuan shih, and a 2-fathom (3^m7) patch lies about 4 cables southward of this rock. A $1\frac{1}{2}$ fathom
15 (2^m7) patch, lies about $1\frac{1}{2}$ miles westward of Hu-p'ing tao. The depths around and between Chu tao and Hu-p'ing tao are very irregular.

Chart 2833.

Hsi-ma-i tao (*Lat.* $39^\circ 12' N.$, *Long.*, $121^\circ 27' E.$), situated about
20 11 miles north-eastward of Hu-p'ing tao, is 187 feet (57^m0) high; Ling-tang-shan tsui and Miao-shan tsui are, respectively, its north-western and south-eastern points, and there is a prominent stone shrine on the latter.

Tung-ma-i tao, 207 feet (63^m1) high, lies about half a mile eastward
25 of Hsi-ma-i tao. A rock with a depth of $1\frac{1}{2}$ fathoms (2^m3) over it, lies nearly one mile southward of Tung-ma-i tao; two rocks, one of which is 8 feet (2^m4) high and the other dries 2 feet (0^m6), lie between this rock and the south-eastern point of Hsi-ma-i tao. A shoal, with depths of less than 3 fathoms (5^m5) over it, extends about one mile
30 northward from Tung-ma-i tao, and on this shoal are three rocks; Ti-li-hsin, the southernmost of these, is about 5 feet (1^m5) high and somewhat flat; Hsiao t'o-tzu (Pien tautze), the middle rock, is 65 feet (19^m8) high; the northernmost rock, situated about 8 cables northward of Tung-ma-i tao, is 25 feet (7^m6) high. Shih t'o-tzu (Ku tautze),
35 a rock 33 feet (10^m1) high, lies about 8 cables eastward of Ti-li-hsin, and a rocky head lies about $1\frac{1}{2}$ cables south-eastward of Shih t'o-tzu. Ta t'o-tzu (tautze), about $1\frac{1}{2}$ miles northward of Hsiao t'o-tzu, is a flat-topped islet 88 feet (26^m8) high; a prominent rock 35 feet (10^m7) high, lies close off the south-western extremity of Ta t'o-tzu, and a
40 reef extends about $1\frac{1}{2}$ cables from the south-eastern side of this islet.

Chart 1798.

Southern side of Kuan-tung wan.—Coast.—Islands and dangers.—

Anchorage.—About 2 miles eastward of Hudson point (page 486) is the western entrance point of Ta-ch'ao-k'ou wan (Vostikorablei bay),
45 an open bay, which is about 2 miles wide at its entrance; a shore bank with depths of less than 3 fathoms (5^m5) over it, extends about half a mile from the southern side of this bay, and the eastern and western shores are fringed by sunken rocks which lie as much as 2 cables offshore.

50 Ying-ch'eng-tzu wan (Ying-chengtze bay) is entered between a point 189 feet (57^m6) high, situated about 6 miles eastward of Hudson point, and Ho-erh-shih (Ho-urr-shih) tsui, situated about $3\frac{1}{2}$ miles north-eastward; the bay is shallow and a bank, which dries, extends as much as half a mile from the eastern shore. Erh-t'o-tzu tao

Charts 1256, 1262.

Chart 1798.

(Are tautze), an islet 193 feet (58^m8) high, lies in the entrance of the bay and about one mile south-south-westward of Ho-erh-shih tsui ; Shih t'o-tzu (tautze) lies close off it's southern side.

Kuan-tsai-t'o-tzu tao (Kuan-tsai tautze), 78 feet (23^m8) high, lies about 4 cables westward of the southern extremity of Erh-t'o-tzu tao. Han-t'o-tzu tao (Kan tautze), an islet 161 feet (49^m1) high, lies about three-quarters of a mile eastward of Erh-t'o-tzu tao and close off the northern shore of the bay. Hei-yü chiao, a rock 2 feet (0^m6) high, lies about 8 cables westward of Ho-erh-shih tsui. An-tzu (Antze) shan is a prominent double peak, 1,203 feet (366^m7) high, situated about 6 miles eastward of the head of Ying-ch'eng-tzu wan ; this peak bearing about 085° leads up the middle of the bay. Ying-ch'eng-tzu wan is exposed to westerly winds, but small vessels, with a draught of less than 10 feet (3^m0), can find shelter there with winds from other quarters.

Charts 1798, 2833.

The coast between Ho-erh-shih tsui (*Lat. 39° 01' N., Long. 121° 18' E.*) and Huang-lung-wei tsui (Ching-sie-chue), a cliffy point situated about 3 $\frac{1}{4}$ miles north-eastward, consists mostly of steep-to points with small shallow bays between ; the land in this vicinity is hilly, and Ssu-p'ing (Nanta) shan, 632 feet (192^m6) high, situated about 1 $\frac{1}{2}$ miles southward of Huang-lung-wei tsui, is the highest peak. Ssu-feng (Se-fung) tsui is situated about 2 miles north-eastward of Ho-erh-shih tsui. Huang-lung-wei tsui rises steeply to Pei shan, a hill 182 feet (55^m5) high ; Hsi-kang, a ledge which dries 5 feet (1^m5), extends nearly three-quarters of a mile westward from the western side of Huang-lung-wei tsui and terminates in a rock awash ; Tung-kang, a ledge which dries 2 feet (0^m6), extends about 6 cables eastwards from the eastern side of this point.

The coast between Huang-lung-wei tsui and Niao-chao yai, a dark cliff 155 feet (47^m3) high, situated about 8 miles eastward, forms a wide bight. Ta-ma t'ou (to) and Shuang t'o-tzu (tautze) are situated, respectively, about 2 and 3 $\frac{1}{2}$ miles south-eastward of Huang-lung-wei tsui ; Mu-ch'eng wan lies between them.

The light for the use of aircraft situated about 2 $\frac{1}{2}$ miles east-south-eastward of An-tzu shan is described on page 688.

Tidal streams.—Between Hsi-hu tsui and Huang-lung-wei tsui the tidal stream runs north-eastward for a period of from 6 to 8 hours, commencing from 2 hours to 3h. 20m. after low water ; it attains its maximum rate, about 2 $\frac{1}{2}$ knots, between 20 minutes and one hour before high water. The stream runs south-westward, with a maximum rate of 1 $\frac{1}{2}$ knots, for a period of from 4 to 6 hours, commencing from 1 $\frac{1}{2}$ to 3 $\frac{1}{2}$ hours after high water. At Hsi-hu tsui the tidal streams run northward and southward, with a maximum rate of 3 knots ; there is a tidal race about one mile off this point.

Chin-chou wan.—**Islands.**—Chin-chou wan (Kinchau bay) is entered between Niao-chao yai and Lu tao, a rounded island, 306 feet (93^m2) high, with precipitous sides, situated nearly 8 miles northward ; the bottom in this bay is soft mud, and mud flats dry out as much as 1 $\frac{1}{2}$ miles from the head of the bay. There is a smooth, prominent bare rock on the coast about one mile eastward of Niao-chao yai. A rocky islet 43 feet (13^m1) high, lies about 4 cables south-eastward of Lu tao. Fanchia t'o-tzu (tautze) lies about 2 miles

Charts 1256, 1262.

Charts 1798, 2833.

south-eastward of Lu tao and half a mile off the northern shore of the bay, and is almost connected to that shore by a bank which dries. Hsiao-lung t'ou (to) lies about $2\frac{1}{2}$ miles south-eastward of Fanchia t'o-tzu.

Lu tao is separated from a headland on the main coast by a channel about 4 cables wide, with a least depth of $1\frac{1}{2}$ fathoms (2^m7) in the fairway; on this headland is Chiao-mai (Chaonio) shan, a precipitous hill 576 feet (175^m6) high. T'ai-tzu (Taitso) shan, 715 feet (217^m9) high, is situated nearly $1\frac{1}{2}$ miles east-south-eastward of Chiao-mai shan.

The walled town of Chin-chou (Kinchau) is situated on the low plain at the head of the bay, and contains a post office and a hospital. It is connected to the general railway and telegraph systems.

Lights.—A light is exhibited at an elevation of 76 feet (23^m2), from a white wooden mast 26 feet (7^m9) in height, situated on the coast about 2 miles north-westward of Chin-chou (*Lat. $39^{\circ}07'N.$, Long. $121^{\circ}42'E.$*).

A light, for the use of aircraft, is exhibited, at an elevation of 652 feet (198^m7), from an iron framework tower, 36 feet (11^m0) in height, about $3\frac{1}{2}$ miles east-north-eastward of the above light.

Tidal streams.—The tidal streams in Chin-chou wan run eastward from about one hour after low water till about one hour after high water, and westward from about one hour after high water till about one-hour after low water; the rate of either stream is not great.

Chart 2833.

Head of Kuan-tung wan.—Islands and dangers.—Light-buoy.—

The coast between Chiao-mai shan and Hei tsui, situated about $4\frac{1}{2}$ miles northward, is indented by two shallow bays, separated from each other by a hilly peninsula which terminates westward in Lao-hu-shan t'ou (to), situated about $1\frac{1}{2}$ miles northward of Chiao-mai shan; the southern bay is named Hou wan (Ho hai), and the northern bay is named Pei hai.

Hu-lu-t'ao chiao is the northern entrance point to Pei hai. Huang t'o-tzu (Hwang tautze) is an islet, 154 feet (46^m9) high, situated in Pei hai.

K'u-lung tao (Kulon tautze), an islet 167 feet (50^m9) high, lies about three-quarters of a mile south-westward of Hei tsui and 4 cables offshore; it is cliffy on its seaward side. A rock, with a depth of $1\frac{1}{2}$ fathoms (3^m2) over it, lies about one mile south-south-westward of K'u-lung tao. A shoal, almost awash, lies about 2 miles west-south-westward of K'u-lung tao.

Northern side of Kuan-tung wan.—Coast.—Islands and dangers.—

Anchorage.—Ta-jen (Ta-zhunn) shih, the northern entrance point of Kuan-tung wan, is the precipitous southern extremity of Hsi-chung tao, a hilly island divided into two parts by a sand flat about 2 miles from its southern end; the summit of the island, about 600 feet (182^m9) high, is situated about one mile north-eastward of Ta-jen shih. Sha-t'an (La Potze), a point on the western side of Hsi-chung tao and about $2\frac{1}{2}$ miles northward of Ta-jen shih, has a smooth round hill on it, 240 feet (73^m1) high. I-mien wan (Sand Hill bay) lies immediately southward of Sha-t'an, and two rocks, which dry, lie within 4 cables north-westward of Ch'ang tsui (Chang-shao), its southern entrance point; the sand on the lower slopes of the hills along this bay is prominent.

Charts 1256, 1262.

Chart 2833.

Tung-chia k'ou (Tung-tzia kau), entered between Ta-jen shih and Miao-chiao (Maochiao) tsui, situated about $2\frac{1}{2}$ miles eastward, affords anchorage to small vessels, in depths of from $1\frac{1}{2}$ to 3 fathoms (2^m7 to 5^m5), but it is open southward. A rock, 6 feet (1^m8) high, 5 lies about 3 cables west-south-westward of Miao-chiao tsui. Lou t'o-tzu (tautze), a rock 69 feet (21^m0) high, lies nearly one mile northward of Miao-chiao tsui and on the edge of the mud flat which dries out about 6 cables from the eastern shore of the bay; this rock marks the eastern side of the entrance to a narrow channel, with 10 depths of from one to 2 fathoms (1^m8 to 3^m7), but the depth on the bar at its entrance is only one foot (0^m3).

There is a signal station on the western side of Tung-chia k'ou.

Miao-chiao tsui is the south-western extremity of Feng-ming tao, an island 812 feet (247^m5) high, which lies, with Hsi-chung tao and 15 several other smaller islands, on the mud bank which extends from the coast eastward; this mud bank dries, but boats can pass over it at high water. The four largest islands northward and eastward of Feng-ming tao, reading from west to east, are Lu-t'o tao, 232 feet (70^m7) high; Chiao-liu tao, 245 feet (74^m7) high; P'ing tao, 81 feet 20 (24^m7) high; and Hsiao tao, 353 feet (107^m6) high. Round point (Lat. $39^\circ 22' N.$, Long. $121^\circ 24' E.$) is the southern extremity of Feng-ming tao.

Small vessels can obtain shelter off the southern side of Feng-ming tao with northerly winds. 25

Yun-t'ai shan, a hill 500 feet (152^m4) high, is situated on the mainland close northward of Cone head, which lies about 6 miles eastward of Round point. T'a-lien t'o-tzu (tautze), an islet with two peaks, 110 feet (33^m5) high, lies about 2 miles west-south-westward of Cone head; Ti-liu-hsing, a rock 54 feet (16^m5) high, lies about 30 half a mile eastward of T'a-lien t'o-tzu; Hsiang-liu-hsing t'o-tzu (Hsienma tautze), an islet 146 feet (44^m5) high, lies nearly $1\frac{1}{2}$ miles east-south-eastward of Ti-liu-hsing.

San-lun-ch'e (San-liang-chow) chiao is a narrow ridge of rocks, some of which dry from 3 to 5 feet (0^m9 to 1^m5), which extends about 35 6 cables west-south-westward from a position about $2\frac{1}{2}$ miles south-south-westward of Cone head. T'u-erh (Tu) tao, lying about $2\frac{1}{2}$ miles south-south-eastward of Cone head, is a somewhat flat rocky islet, 110 feet (33^m5) high; this islet stands on the outer edge of a bank, which dries, extending from the coast eastward of Yun-t'ai shan. Sha 40 tao (tautze), an islet 28 feet (8^m5) high, lies about 2 miles south-westward of T'u-erh tao, and a cleft runs across it from east to west; a reef extends about $1\frac{1}{2}$ cables from the south-eastern side of Sha tao.

Light.—A light is periodically exhibited, at an elevation of 245 feet (74^m7), from a white circular concrete structure, 25 feet (7^m6) in 45 height, situated on Ta-jen shih.

P'u-lan-tien chiang.—**General remarks.**—P'u-lan-tien chiang is entered between T'u-erh tao and Hei tsui, and runs north-eastward for 10 miles to Po-chi tao; it then turns abruptly eastward for a further 10 miles, until it reaches the town of P'u-lan-tien at the head 50 of the harbour. The surrounding district is an important salt producing centre, and there are also coal mines in the vicinity. Vessels with a draught of 18 feet (5^m5) can enter the harbour at high water, but at low water it is only available for vessels with a draught

Charts 1256, 1262.

Chart 2833.

of 12 feet (3^m7) ; a heavy gale can make a difference of 2 feet (0^m6) in the level of the water in the harbour.

For administration purposes the line joining Ta-jen shih (page 490) and Hsi-ta shan (*see* below) is considered as the outer limit of the harbour.

The town of P'u-lan-tien is situated on the southern side of the head of the harbour, and is connected to the railway system. It is connected to the general telegraph system.

- 10 **Coasts.—Islands and banks.**—Hei tsui (*Lat.* 39° 17' N., *Long.* 121° 35' E.), the southern entrance point of P'u-lan-tien chiang, is the north-western extremity of a hilly promontory, which rises about half a mile south-south-eastward of Hei tsui to Hsi-ta shan, a peak 238 feet (72^m5) high ; Taitze shan, situated about 2½ miles
15 eastward of Hsi-ta shan, is 511 feet (155^m7) high. Between Hsi-shan tsui, the northern extremity of this promontory, and a point situated about 7 miles north-eastward, the coast is indented by a bight, which dries out as much as 1½ miles from the low-lying land at the head. This bight is divided into two parts by a point situated about 4½
20 miles eastward of Hei tsui ; the hills near the former point rise to an elevation of nearly 300 feet (91^m4), and Ta-ting shan, a prominent hill 515 feet (157^m0) high, is situated about 2 miles south-south-eastward of this point. The land at the north-eastern end of this bight is also hilly ; Tai shan, the highest peak in this vicinity, is
25 situated about 6 miles north-eastward of Ta-ting shan and is 705 feet (214^m9) high.

Chang tao, 197 feet (60^m0) high, lies with its northern extremity about 4½ miles east-north-eastward of Hei tsui, and its southern extremity is on the outer edge of the drying coastal bank which
30 extends from the southern shore of P'u-lan-tien chiang ; Antze shan is an islet, 120 feet (36^m6) high, lying close off the north-western point of Chang tao, and Huang t'o-tzu (Hwang tautze) is an islet, 114 feet (34^m7) high, lying nearly three-quarters of a mile west-south-westward of the southern extremity of Chang tao.

- 35 Ch'ing tao, 258 feet (78^m6) high, lies with its southern extremity nearly 3 miles north-eastward of the southern extremity of Chang tao and on the drying bank which extends from the southern shore of P'u-lan-tien chiang. Tan t'o-tzu (Tantotsu) is a rocky islet, 65 feet (19^m8) high, lying nearly half a mile north-westward of the north-
40 western point of Ch'ing tao. Hsiao t'o-tzu (tautze) is an islet, 65 feet (19^m8) high, lying nearly three-quarters of a mile north-eastward of the northern point of Ch'ing tao and about one cable offshore ; Ta t'o-tzu (tautze), 117 feet (35^m7) high, lies about half a mile northward of Hsiao t'o-tzu (*Lat.* 39° 21' N., *Long.* 121° 44' E.),
45 and there is another small islet, 35 feet (10^m7) high, close eastward of the former.

The northern shore of the outer part of P'u-lan-tien chiang is fronted by a broad bank, which dries ; the outer edge of this bank runs from T'u-erh tao to Pa-kou chiao, an islet, 68 feet (20^m7) high,
50 which lies close off a point in the mainland situated about 8 miles north-eastward. San-leng (Sanlung) shan, a hill 754 feet (229^m8) high, is situated on the mainland about 6 cables west-north-westward of Pa-kou chiao ; T'ai-tzu (Taitze) shan, 692 feet (210^m9) high, is situated about 2½ miles westward of San-leng shan.

Charts 1256, 1262.

Chart 2833.

Channel.—Islands and dangers.—Buoyage.—The entrance channel, which is marked by buoys, which are removed during the ice season, is a comparatively narrow passage between the banks extending from either side of the estuary. The depths are liable to change, and the fairway was being maintained by dredging in 1940. 5

La-shih chiao, situated about $1\frac{1}{2}$ miles north-eastward of Hei tsui, is a rock, 17 feet (5^m2) high, situated on the southern side of the fairway; two rocks, which dry 3 feet (0^m9) and 7 feet (2^m1), lie a quarter of a mile and half a mile, respectively, south-eastward of 10 La-shih chiao. A light-buoy, painted black and exhibiting a *white flashing* light, is moored about half a mile north-westward of La-shih chiao.

Pei-chue cho, a shoal with a least depth of 2 feet (0^m6) over it, lies about one mile north-eastward of La-shih chiao and on the 15 southern side of the fairway. Wai-shuang t'o-tzu (Wai-shwang tautze) consists of two rocky islets about 3 cables apart, each 65 feet (19^m8) high, connected to each other by a shoal with a least depth of 3 feet (0^m9); these rocks are on the southern side of the fairway, and the south-western lies about $1\frac{1}{2}$ miles north-eastward of La-shih chiao. 20 The fairway abreast Wai-shuang t'o-tzu is barely a quarter of a mile wide, and the northern side is formed by a bank which dries, named Chung chou (cho).

A cylindrical light-buoy, No. 2, painted red, and exhibiting a *white flashing* light every four seconds, is moored about one mile north- 25 westward of the north-western extremity of Ch'ing tao.

Po-chi tao lies with its southern extremity about 4 cables north-eastward of Ta t'o-tzu (*Lat. $39^\circ 22' N.$, Long. $121^\circ 44' E.$*) and on the southern side of the bend in the channel in P'u-lan-tien chiang; the summit of this island, 472 feet (143^m9) high, is situated on its 30 northern end. A bank, which dries, extends nearly three-quarters of a mile from the western side of Po-chi tao, and on the outer edge of this bank is Nei-shuang t'o-tzu, a rocky islet 105 feet (32^m0) high; another rocky islet, 68 feet (20^m7) high, lies nearly one cable further westward. The latter islet forms the south-eastern side of the fair- 35 way, and is fairly steep-to on its western side; Pa-kou chiao marks the north-western side of the channel here.

The north-western side of the fairway about 8 cables south-south-westward of Pa-kou chiao is marked by a conical buoy, painted red and black in horizontal bands, and surmounted by a sphere. The 40 channel between Pa-kou chiao and the northern extremity of Po-chi tao is marked by two red conical buoys, Nos. 6 and 8, each surmounted by a triangle, and by a pillar light-buoy, No. 4, painted red and exhibiting a *red flashing* light every five seconds.

Eastward of Po-chi tao the channel is narrowed by banks which 45 extend from either shore and dry. A rock, 4 feet (1^m2) high, lies about $3\frac{1}{2}$ cables south-eastward of the north-eastern point of Po-chi tao and on the southern edge of the channel. Ho-t'a-lien tao, 154 feet (46^m9) high, lies with its western extremity about 6 cables south-eastward of the north-eastern point of Po-chi tao; the channel runs 50 along the northern side of this island, and there are depths of more than 5 fathoms (9^m1) here in the fairway. Chien-t'a-lien tao, 190 feet (57^m9) high lies close southward of the eastern part of Ho-t'a-lien tao. An electric overhead cable crosses the harbour from Chien-t'a-lien tao

Chart 2833.

to Ho-t'a-lien tao and thence to the mainland north-westward ; the lowest part of the cable is 125 feet (38^m1) above high water.

- About one mile eastward of Ho-t'a-lien tao the channel widens to
 5 about half a mile, with depths of from 1½ to 3 fathoms (2^m3 to 5^m5),
 and then gradually narrows again to a width of about one cable.
 Shao-ping tao, 33 feet (10^m1) high, and Ma-lu t'o-tzu (Malutautsu),
 56 feet (17^m1) high, are situated, respectively, about 2½ and 5½ miles
 above Ho-t'a-lien tao. The head of the harbour is encumbered by a
 10 shallow mud flat, through which are narrow channels only suitable
 for boats. Hsiao-heh (Kwang-uing) shan, a hump-shaped mountain
 about 6½ miles south-eastward of Chien-t'a-lien tao, is 1,535 feet
 (467^m9) high and is prominent.

- Light.**—A light is periodically exhibited, at an elevation of 82 feet
 15 (25^m0), from a white circular concrete structure, about 20 feet (6^m1)
 in height, situated on the south-western islet of Wai-shuang t'o-tzu.

- Anchorage.**—There is good anchorage for vessels with local
 knowledge, in depths of from 3½ to 5 fathoms (6^m4 to 9^m1), in a blind
 channel which extends about one mile east-north-eastward from a
 20 position midway between Wai-shuang t'o-tzu and Chang tao.

- There is anchorage for vessels with local knowledge, in depths of
 from 3 to 4 fathoms (5^m5 to 7^m3), about one mile westward of Ta
 t'o-tzu, and also further up the channel, after passing Pa-kou chiao,
 in a depth of about 6 fathoms (11^m0) ; vessels loading coal usually
 25 anchor westward of Ta t'o-tzu.

Vessels with local knowledge can obtain anchorage northward of
 Ho-t'a-lien tao, and also about one mile further up, where the channel
 widens out.

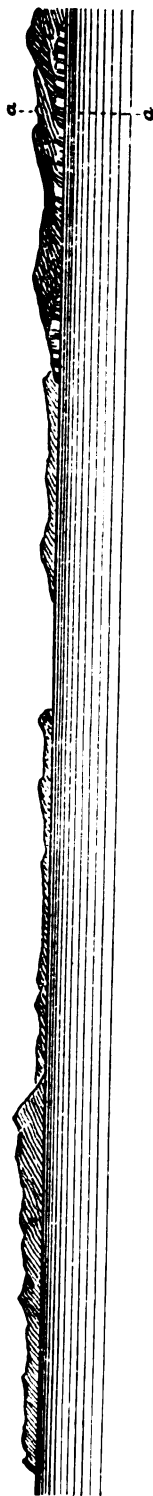
- Tidal streams.**—The tidal streams are fairly regular and set in
 30 the direction of the channel. Off Chang tao the in-going stream com-
 mences one hour after low water and runs for about 7 hours ; the
 out-going stream commences about 2 hours after high water. Both
 stream attain their maximum rate, from 1½ to 2½ knots, between
 3½ and 4 hours after low and high water, respectively.

- Directions.**—A vessel from south-westward should approach with
 35 Chiao-mai shan (page 490) in line with the summit of Lu tao, bearing
 064°, until Ta t'o-tzu bears 350° and is open eastward of Tung-ma-i
 tao, when she should steer for a position about half a mile north-
 westward of Lu tao (*Lat.* 39° 11' N., *Long.* 121° 34' E.) ; thence steer
 40 northward to pass about 2 cables westward of K'u-lung tao, taking
 care, however, to avoid the rock, with a depth of 1½ fathoms (3^m2)
 over it, which lies about one mile south-south-westward of this island.

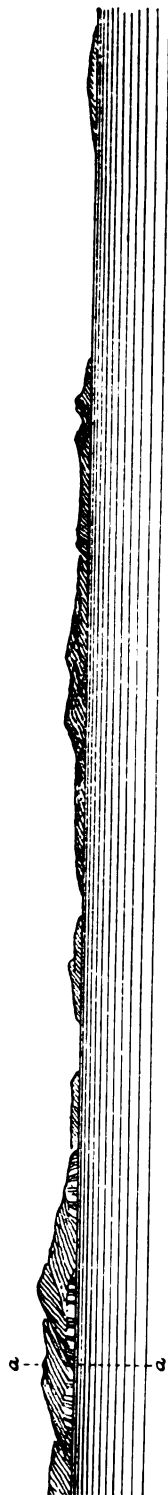
- A vessel approaching from westward should pass about half a
 mile southward of Ta t'o-tzu and continue eastward until K'u-lung
 45 tao bears 045°, when she should steer for it on that bearing and pass
 about 2 cables westward of this island.

- A vessel from north-westward can approach by steering south-
 eastward so as to pass about one mile north-eastward of Ta t'o-tzu,
 taking care to avoid the shoal, almost awash, which lies about mid-
 50 way between Ta t'o-tzu and K'u-lung tao ; when the latter island
 bears 045° it should be steered for on that bearing, and passed about
 2 cables westward.

Small vessels can approach the entrance to P'u-lan-tien chiang by
 steering eastward from a position about half a mile southward of Sha



Hu-lu-shan tsui;
bearing about 040°, 17 miles.



View, in two parts, of approach to Hu-lu-shan wan (bay).
(Original dated 1880).

Chart 2833.

tao (page 491) ; a least depth of $1\frac{3}{4}$ fathoms (3^m2) can thus be carried over the bank eastward of this islet.

Local knowledge is considered to be essential for navigation above Hei tsui (page 490).

Hu-lu-shan wan.—**Anchorage.**—Hu-lu-shan wan (bay) is entered between Sha-t'an (page 490) and Wu-tao-kou tsui-tzu (Pei chia), a cliffy point situated about $5\frac{1}{2}$ miles northward : the southern shore of the bay is formed by the north-western side of Hsi-chung tao, and the northern shore is formed by the south-western part of Ch'ang-hsing tao, an island almost connected to the mainland, of which Wu-tao-kou tsui-tzu is the south-western extremity. The land within Wu-tao-kou tsui-tzu rises in irregular hills to T'a shan, 1,081 feet (329^m5) high, the summit of Ch'ang-hsing tao, situated about $2\frac{1}{2}$ miles north-eastward of this point, and then descends steeply eastward to a plain ; these hills appear as an island from a distance. Ta-ku (Taiku) shan, 1,014 feet (309^m1) high, is situated about 7 miles eastward of T'a shan and is the next highest peak on Ch'ang-hsing tao. See view facing this page.

Sung-shu tsui (Sung-shu-chutze) is situated about 2 miles north eastward of Sha-t'an.

Hu-lu-shan tsui is a projecting headland, 302 feet (92^m0) high situated at the head of the bay and nearly 3 miles east-south-eastward of Wu-tao-kou tsui-tzu. Hu-lu-shan tsui is the northern entrance point of a narrow shallow channel, which runs in a north-easterly and easterly direction ; in the entrance there is a depth of barely 5 feet (1^m5) over the bar.

Hu-lu-shan wan affords anchorage in depths of less than 8 fathoms (14^m6), sand and clay, good holding ground, sheltered from all except westerly winds. Small vessels can anchor on the northern side of the bay, sheltered from north-westerly winds, or on the southern side, sheltered from south-south-westerly winds.

Light.—A light is exhibited at an elevation of 656 feet (199^m9), from a white circular concrete structure, 33 feet (10^m1) in height, situated on a hill about 6 cables northward of Wu-tao-kou tsui-tzu (*Lat.* $39^\circ 31'$ N., *Long.* $121^\circ 13'$ E.).

Coast.—**Dangers.**—Ma-chia tsui, situated about $1\frac{3}{4}$ miles northward of Wu-tao-kou tsui-tzu, is a narrow point rising close within to a hill about 240 feet (73^m1) high ; the coast between these two points is cliffy and steep-to. Chang-chia tui, a shoal, with depths of from 4 feet (1^m2) to 4 fathoms (7^m3) over it, extends about 2 miles north-eastward from a position about 3 cables north-north-eastward of Ma-chia tsui ; this shoal is steep-to on the seaward side, and there are depths of from 6 to 8 fathoms (11^m0 to 14^m6) between it and the coast.

Kao-nao-tzu chiao (Slaney head), situated about $4\frac{3}{4}$ miles north-eastward of Ma-chia tsui, is the seaward side of Kao-nao-tzu (Niu-hsin) shan, a rounded headland, 426 feet (129^m8) high, with precipitous cliffs ; a reef extends about half a mile north-eastward from Kao-nao-tzu chiao, and Kao-nao-tzu (Kao-naotze), a rock 70 feet high, lies close off the cliff on the north-western side of the headland.

Fu-chou wan.—**Islands and dangers.**—**Anchorage.**—Fu-chou wan (Fucho bay) is entered between Kao-nao-tzu chiao and Fu-chou chiao

Charts 1256, 1262.

Chart 2833.

(Fucho point), situated about 11 miles north-eastward, and has fairly regular depths, mud bottom, decreasing gradually from about 7 fathoms (12^m8) in the entrance towards the head of the bay; the northern side of Ch'ang-hsing tao forms the southern shore of the bay. Fu-chou chiao has a flat-topped hill on it, 79 feet (24^m1) high; a reef extends fully one mile westward from this point, and San-ch'en-che (Ragged rocks), lying on the outer part of the reef, dries 6 feet (1^m8).

Mao-tzu (Maotze) chiao lies about 3 miles north-eastward of Kao-nao-tzu chiao and dries 6 feet (1^m8). A rock, 5 feet (1^m5) high, lies about one mile southward of Mao-tzu chiao and 4 cables offshore; another rock, 30 feet (9^m1) high, lies nearly 3 miles eastward of Mao-tzu chiao and half a mile offshore.

Ch'en-chia (Chunn-chia) tsui is a rocky headland near the head of the bay and about 7 miles east-north-eastward of Kao-nao-tzu chiao. Hao-tzu (Haotze) tao, lying about 2½ miles north-eastward of Ch'en-chia tsui, is a flat-topped islet 85 feet (25^m9) high, situated near the edge of the coastal bank which extends from the head of the bay. Between Chu-chia tsui, situated about 1½ miles eastward of Ch'en-chia tsui, and Hao-tzu tao is the entrance to a shallow channel, which separates the north-eastern extremity of Ch'ang-hsing tao from the mainland. Ma-chia t'o, an island, with two hillocks on it 82 feet (25^m0) and 69 feet (21^m0) high respectively, lies on the southern side of the entrance channel and about midway between Chu-chia tsui and Hsi-chu-tzu, a point on the mainland about 2½ miles eastward.

A good position for anchoring is with the western extremity of Ch'en-chia tsui bearing 176°, and Chu-chia tsui bearing 117°, in a depth of about 4½ fathoms (8^m2); small vessels can anchor further eastward.

Off-lying bank.—Chang-hsing tui, a bank, with depths of from 7 to 10 fathoms (12^m8 to 18^m3) over it, lies about 10 miles west-south-westward of Fu-chou chiao.

Coast.—Islets and dangers.—Hung-shih tsui (Fort head), situated about 3½ miles northward of Fu-chou chiao, is a rounded headland 118 feet (36^m0) high, and from 1½ to 4 miles eastward of it are some hills which bear a remarkable resemblance to extensive fortifications. Between Fu-chou chiao and Hung-shih tsui is a bay with depths of from 1½ to 3 fathoms (3^m2 to 5^m5), the shores of which are fairly steep-to; a stream flows through marshy land at the head of the bay. Wen t'o-tzu (Wei-lien tautze), an islet 88 feet (26^m8) high, lies about half a mile westward of Hung-shih tsui (*Lat.* 39° 48' N., *Long.* 121° 27' E.).

An isolated shoal, with a least depth of 4½ fathoms (8^m7) over it, lies from one to 2 miles north-westward of Fu-chou chiao. A narrow bank, with depths of less than 6 fathoms (11^m0) over it in places, extends one mile north-westward and then 3 miles north-north-eastward from the above shoal.

Chart 1256.

Ta-kou tsui-tzu (Takowtsuitze) is situated nearly 5 miles north-eastward of Hung-shih tsui, and rises gradually to Taku shan, a hill, 541 feet (164^m9) high, situated about one mile south-eastward of the point; about 3½ miles further south-eastward is Lo-t'o shan, a double-topped hill, the southern peak of which is 1,090 feet (332^m2) high and is curiously shaped. There are prominent sandhills along

Chart 1262.

Chart 1256.

the coast between Hung-shih tsui and Ta-kou tsui-tzu; two rocks, called Chang chiao, lying close together, which dry one foot (0^m3), lie about midway between these two points and about 6 cables offshore, and about half a mile further north-eastward is Ku chiao, a rock 5 which dries 3 feet (0^m9).

Nearly 5 miles north-eastward of Ta-kou tsui-tzu is a point with Paitzu shih, a rock, 42 feet (12^m8) high, lying close off it; there is a bight between these two points, in the middle of which is a reef, on which is Laoku tao, 29 feet (8^m8) high. Chiang (Kiang) shih, a rock, 10 71 feet (21^m6) high, lies close off a point lying about 7 miles north-eastward of Ta-kou tsui-tzu, and is very prominent.

About $5\frac{1}{2}$ miles east-north-eastward of Chiang shih are McGowan cliffs, which are about 160 feet (48^m8) high; Lao-mu-chu chiao, a reef, which dries 7 feet (2^m1), lies about $1\frac{1}{2}$ miles south-westward of 15 these cliffs. T'ai-p'ing wan is entered between Hung-shih tsui, situated about 2 miles north-eastward of McGowan cliffs and T'ai-p'ing chiao, lying about $3\frac{1}{2}$ miles northward; the bay is shallow and the head of it dries. T'ai-p'ing chiao is the extremity of a hilly promontory, and rocks extend about half a mile north-westward from 20 it. There is a rock awash about half a mile south-westward of the north-western extremity of T'ai-p'ing chiao.

Paisha (Pehsha) shan, situated about 6 miles north-eastward of T'ai-p'ing chiao, has a hill on it, 405 feet (123^m4) high, the slopes of which are sand, and it is prominent from seaward of Li-chia chiao (see 25 below). Paisha wan (Saddle bay), entered between Paisha shan and Tu-erh (Tolo) tao, situated nearly 6 miles north-north-eastward, is shallow, and a bank, which dries, extends three-quarters of a mile offshore in places, and a one-fathom (1^m8) patch lies $1\frac{1}{2}$ miles offshore in the middle of the bay. Within the coast between T'ai-p'ing chiao 30 and Paisha shan (*Lat.* $40^\circ 08' N.$, *Long.* $122^\circ 00' E.$), hills rise from the extensive plains to a maximum elevation of 923 feet (281^m3), whilst some 12 miles eastward of Tu-erh tao is a precipitous mountain chain which attains an elevation of over 2,000 feet (609^m6).

Tu-erh tao is a group of hills on a point projecting from a large 35 plain; the two western hills are 154 feet (46^m9) high, and a large square tower stands about one mile eastward of them. From westward Tu-erh tao appears like an island with three saddles. A rock, which dries 3 feet (0^m9), lies about half a mile south-westward of Tu-erh tao, and there is foul ground within half a mile westward and 40 northward of the point. A 4-foot (1^m2) patch lies about $1\frac{1}{2}$ miles north-westward of the point, and a patch, with a least depth of 4 feet (1^m2) over it, lies about 3 miles northward of the point.

Off-lying shoals and banks.—An isolated 6-fathom (11^m0) patch lies about 5 miles north-westward of Chiang shih, and two similar 45 patches lie, respectively, about $3\frac{1}{2}$ and $4\frac{1}{2}$ miles further north-eastward. Li-chia chiao (Rika shō) consists of banks of coarse sand, on which the sea breaks heavily during north-westerly and westerly winds, lying within 10 miles of the coast between McGowan cliffs and Tu-erh tao. The least depth on the outer bank, in a position about 50 9 miles westward of Tu-erh tao, is $1\frac{3}{4}$ fathoms (3^m2), whilst there is a least depth of 3 feet (0^m9) on the inner banks. The seaward side of the outer bank is steep-to, and there are channels, in which the depths are irregular, between the various banks.

Chart 1262.

Chart 1256.

Coast.—Dangers.—T'ai-tzu (Daitze) shan (*Lat.* 40° 18' N., *Long.* 122° 06' E.), 395 feet (120^m4) high, rises on the coast about 9 miles north-north-eastward of Tu-erh tao, and has a prominent tower on its summit; about 1½ miles eastward of it is Lao-hu shan, a hill 549 feet (167^m3) high. Some rocks lie in the middle of the light between Tu-erh tao and T'ai-tzu shan; the outer of these lies about three-quarters of a mile offshore and dries 13 feet (4^m0). A shoal with a least depth of 3½ fathoms (5^m9) over it, lies about 5½ miles west-south-westward of T'ai-tzu shan.

Eastward of a line drawn 6½ miles northward from T'ai-tzu shan there are depths of less than 3 fathoms (5^m5), and just within this line are several patches with depths of from 3 feet to 1½ fathoms (0^m9 to 2^m3). About 8½ miles north-north-eastward of T'ai-tzu shan is Kai-p'ing chiao, a clifly point with a pagoda on it; some rocks, which dry 3 feet (0^m9), lie about 3 cables westward of this point.

The coast between Kai-p'ing chiao and the southern entrance point of Liao ho, situated about 12 miles northward, consists of swampy land, fronted by a soft mud bank which dries out nearly 3 miles offshore. About 9½ miles eastward of Kai-p'ing chiao is a sharp cone 1,009 feet (307^m5) high, which is the highest peak of a range of hills. Kai-p'ing ho, a stream which flows out about 3 miles eastward of Kai-p'ing chiao, becomes a torrent during rains.

Chart 2991.

LIAO HO.—General remarks.—Liao ho or Ta-liao ho rises in the highlands of Mongolia some 150 miles north-westward of Lin-yü (page 480), and enters the sea in the north-eastern corner of Liao-tung wan. It was first surveyed in 1860, and it was then an excellent waterway; since the unprecedented floods of 1889 altered the channels, however, the volume of water and the depths have so decreased that the upper reaches are no longer of much use for water transport.

The lower part of the river passes through a plain only a few feet above sea level. Ying-k'ou (Yingkow), situated about 13 miles above the bar, can be reached by ocean-going vessels, which can cross the bar at favourable states of the tide, but it is ice-bound in winter.

Depths.—Liao ho is at its highest level in July and August, which is the rainy season, and next to that in March and April, after the ice has melted; it is lowest in the autumn. The amount of water taken for irrigation purposes is stated to be increasingly affecting the level of the river.

Since the completion of the training walls at the entrance to the river the mean depth on the bar channel from June to November has been about 18 feet (5^m5) at high water spring tides and about 16 feet (4^m9) at high water neap tides; a southerly wind raises the water level on the bar, and a northerly wind lowers it. It was reported, in 1947, that the depth over the bar was 17 feet (5^m2) at high water springs. Any vessel which can cross the bar will have no difficulty in proceeding up to Ying-k'ou.

Cautions.—Depths in Liao ho are liable to considerable shoaling owing to silting; chart No. 2991 should, therefore, be used with extreme caution.

According to the latest determinations all longitudes shown on this

Chart 1262.

Chart 2991.

chart should be decreased by $1^{\circ} 50'$. The true north of this chart is, according to the latest Chinese chart, in error ; all bearings should, therefore, be decreased by 2° .

Ice.—Liao ho is frozen over from December to March, inclusive, 5 the exact dates varying according to the season ; the ice is from 9 to 24 inches (0^m2 to 0^m6) thick. If not actually blocked by ice at the end of November, the river is then dangerous for navigation owing to drift ice. Power vessels can enter the river two days after the thaw, but they must keep a lookout for drift ice for about 20 days subsequently. 10

Vessels remaining in the river after it has started to freeze should moor with two anchors close to the right bank, where it freezes later and the ice is thinner ; they should not, however, remain later than November 20th. To winter in the river it is necessary to dig a dock 16 in the river bank and secure the vessel inside it ; see page 505.

Pilots.—A pilot schooner, having licensed pilots on board for Liao ho, cruises near the light-vessel, except in bad weather. The schooner flies the pilot flag, red and white, and the words " Licensed pilot " are painted on the main sail. The pilots are under the control 20 of the Harbour-master, by whose directions vessels are berthed. Pilotage is optional. It was reported, in 1946, that only one pilot was available.

Chart 1256.

Shoal in the approach.—A shoal bank extends about 15 miles 25 southward from Kai-chou tui (page 485), and partly across the approach to Liao ho. The southern extremity of this bank, with a depth of less than 5 fathoms (9^m1) over it, lies about 15 miles north-westward of T'ai-tzu shan (page 498), and 12 miles south-westward of the outer end of the entrance channel to Liao ho. 30

Chart 2991.

Light-vessel.—**Fog signal.**—**Anchorage.**—A light-vessel, painted red, with *Newchwang* in white letters on her sides, is moored about 15 miles north-north-westward of T'ai-tzu shan, and 2 miles south-westward of the bar of Liao ho ; a light is exhibited, at an elevation 35 of 35 feet (10^m7), from a steel tower. A fog signal is sounded from the light-vessel.

The light-vessel is withdrawn from about 15th November to 1st April on account of ice.

Anchorage may be obtained as convenient near the light-vessel, 40 observing that the depths decrease gradually eastward.

Entrance channel.—**Signal station.**—**Beacons.**—**Shoal.**—**Obstruction.**—The entrance to Liao ho is approached over a bar of very hard sand, and the channel then leads between West and East banks, which dry, and extend some miles from the low entrance points of the 45 river. The wooded banks of the river near its mouth are so low that they cannot be seen from the deck of a vessel at a distance of 7 miles.

The Bar signal station (*Lat. $40^{\circ} 38' N.$, Long. $122^{\circ} 09' E.$*) is situated on the eastern side of the entrance to the river, and consists of a mast 125 feet (38^m1) high, with a yard 95 feet (29^m0) above the ground. 50

Training walls have been constructed on the banks on either side of the entrance channel. East training wall, which uncovers, extends fully 6 miles south-westward from a position about one mile south-westward of the Bar signal station ; there are 6 beacons,

Chart 2991.

each consisting of a pole surmounted by a disc, on this training wall, and they are numbered consecutively from No. 5, known as East Spit beacon, situated just within the inner end of the wall, to No. 10, known as Wall End beacon, which is situated on the outer end. Works were in progress, in 1942, to extend East training wall about three-quarters of a mile further west-south-westward; the outer end of the works was marked by a buoy. On the western side of the channel, stones, awash, form a submerged training wall about one mile in length, the outer end of which lies about 2 miles below East Spit beacon. West training wall, which dries from 4 to 7 feet (1^m2 to 2^m1) extends about one mile southward from the western entrance point of the river. Some of the beacons on the training walls are replaced by spar buoys from November to April.

15 A shoal, with a depth of 10 feet (3^m0) over it, was reported, in 1948, close south-eastward of Bar leading line (*see* below) about $2\frac{1}{2}$ miles west-south-westward of Wall End beacon.

In 1947, an obstruction was reported on Bar leading line nearly $2\frac{1}{2}$ miles west-south-westward of Wall End beacon.

20 **Leading lights.—Buoyage.—Beacons.**—West Bank beacon, consisting of a pole surmounted by a sphere, is situated near the outer end of West Bank and about 2 miles northward of Wall End beacon. East Bank beacon, a pole surmounted by a triangle, is situated about $2\frac{1}{4}$ miles east-south-eastward of Wall End beacon. North-west beacon, situated about $2\frac{1}{4}$ miles west-north-westward of the Bar signal station is a black pole, surmounted by a sphere.

Bar leading lights are situated on the eastern entrance point of the river; the front light is exhibited, at an elevation of 50 feet (15^m2), from a tower-shaped iron structure situated nearly 2 miles southward of the Bar signal station; the rear light is exhibited, at an elevation of 80 feet (24^m4), from a similar structure situated about half a mile east-north-eastward of the front light. These lights in line, bearing about 060° , lead over the bar.

Entrance light-buoy, painted black and exhibiting a *white flashing* light every three seconds is moored near Bar leading line and about $1\frac{1}{2}$ miles west-south-westward of Wall End beacon.

Inner channel leading lights are situated near the Bar signal station (*Lat.* $40^\circ 38' N.$, *Long.* $122^\circ 09' E.$); the front light is exhibited, at an elevation of 44 feet (13^m4) from a tower-shaped iron structure situated close south-westward of the signal station; the rear light is exhibited, at an elevation of 73 feet (22^m3), from a similar structure situated about half a mile north-eastward of the front light. These lights in line, bearing about 040° , lead through the channel from Middle light-buoy to a position off No. 7 beacon on the East training wall.

Middle light-buoy, painted red and exhibiting a *red flashing* light every three seconds is moored on the south-eastern side of the channel and close southward of the intersection of the Bar leading line and the Inner channel leading line, and about $1\frac{1}{2}$ miles east-north-eastward of Wall End beacon. Inner light-buoy, painted black and exhibiting a *white flashing* light every three seconds, is moored on the north-western side of the fairway and about $1\frac{1}{4}$ miles south-westward of No. 7 beacon on the East training wall.

West Channel leading beacons are situated northward of the West

Charts 1256, 1262.

Chart 2991.

training wall ; the front beacon, situated nearly $3\frac{1}{4}$ miles northward of the Bar signal station, is 44 feet (13^m4) high and is surmounted by a triangle ; the rear beacon, situated about half a mile north-north-eastward of the front beacon, is 83 feet (25^m3) high, and is surmounted 5 by an inverted triangle. These two beacons in line, bearing about 015° , lead through the fairway from No. 7 beacon till nearly abreast East Spit beacon.

West Fish Stakes beacon, consisting of a pole surmounted by a sphere, is situated on the western side of the fairway and about 9 10 cables south-westward of East Spit beacon ; it marks the end of the fishing stakes which are set up each year, and is removed with the stakes in winter and replaced by a black spar buoy. Another beacon is situated close southward of West Fish Stakes beacon.

A light-buoy, painted black, exhibiting a *white flashing light every 15 three seconds*, is moored about 2 cables northward of West Fish Stakes beacon and on the western side of the fairway.

No. 3 leading lights are situated southward of Old Fort (*Lat. $40^\circ 40'$ N., Long. $122^\circ 10' E.$*), which is on the eastern side of the channel opposite the southern part of the West training wall : the front light 20 is exhibited, at an elevation of 34 feet (10^m4), from a wooden mast situated about $1\frac{1}{4}$ miles north-north-eastward of the Bar signal station ; the rear light is exhibited, at an elevation of 57 feet (17^m4), from a similar structure situated nearly 3 cables north-eastward of the front light. These lights in line, bearing about 040° , lead through the 25 fairway from East Spit beacon to Middle Bank light-buoy (*see below*).

Two turning lights are situated near Bar leading lights. The south-eastern of these two lights is exhibited, at an elevation of 50 feet (15^m2), from a beacon situated about 2 cables north-westward of the front Bar leading light ; this light in line with the rear Bar 30 leading light, bearing about 080° , marks the point of intersection of Inner Channel leading lights and West Channel leading lights. The north-western turning light is exhibited, at an elevation of 24 feet (7^m3), from a beacon situated about 3 cables north-westward of the south-eastern turning light ; these two lights in line, bearing about 35 125° , mark a position on the alignment of No. 3 leading lights where a shoal extends nearly half way across the channel from the East training wall at East Spit beacon.

Middle Bank light-buoy, painted red and exhibiting a *red flashing light every three seconds* is moored on the eastern side of the fairway 40 and about $1\frac{1}{4}$ miles northward of the Bar signal station.

No. 4 leading lights are situated near the Bar signal station, the rear light of this leading line being also the rear light of Inner Channel leading lights ; the front light is exhibited, at an elevation of 50 feet (15^m2), from a wooden post situated about 3 cables northward of the 45 rear light. These lights in line astern, bearing about 174° , lead from Middle Bank light-buoy to the turn by Yung-yuan chiao, situated nearly $4\frac{1}{4}$ miles northward of the Bar signal station.

Three red spar buoys, Nos. 1, 2, and 3, mark a line of piles for controlling the water on the eastern side of the channel between Middle 50 Bank light-buoy and a position about 2 miles northward. A black spar buoy is moored on the western side of the channel near the southern end of West training wall. Flagstaff beacon, a red and white pole surmounted by two diamonds, is situated near Old Fort.

Charts 1256, 1262.

Chart 2991.

A light-buoy, painted red and exhibiting a *red flashing light every two and a half seconds* is moored about 6 cables north-westward of Yung-yuan chiao, and marks the edge of the bank which extends 5 fully 4 cables north-westward from Yung-yuan chiao and dries. The outer edge of this bank is marked by two pairs of beacons. The southern pair, known as Fish House Transit beacons, are situated near the northern end of West training wall, and are in line astern, bearing about 195°. The northern pair, known as Railway Transit 10 beacons, are situated on the northern bank of the river northward of Yung-yuan chiao, and are in line bearing about 053°. Each front beacon is a pole surmounted by a black triangle, and each rear beacon is a pole surmounted by a black inverted triangle.

Harbour west leading lights (*Lat. 40° 41' N., Long. 122° 11' E.*) 15 are situated on the southern bank of the river and at the western end of the town of Ying-k'ou: the front light is exhibited, at an elevation of 34 feet (10^m4), from a wooden pole surmounted by a red triangle situated about 1½ miles above Yung-yuan chiao; the rear light is exhibited, at an elevation of 50 feet (15^m2), from a wooden pole 20 surmounted by a red inverted triangle situated about one cable south-eastward of the front light. These two lights are in line bearing about 138°.

Leading lights are exhibited on the southern bank of the river about 3 cables eastward of the Customs flagstaff, which is situated about 25 3½ miles above Yung-yuan chiao: the front light is exhibited, at an elevation of 30 feet (9^m1), from a white wooden pole surmounted by a triangle; the rear light is exhibited, at an elevation of 44 feet (13^m4), from the radio mast of Ying-k'ou Navigation Office, situated about a quarter of a cable west-south-westward of the front light. These 30 lights are in line bearing about 245°.

Two pairs of beacons are charted on the eastern bank of the river about 2½ miles north-eastward of the Customs house.

Depth signals.—Depth signals, as shown in the diagram facing this page, are displayed from the Bar signal station; these signals are 35 made by black balls by day, and by *white* lights at night. When the tide is rising, a black ball or a *white* light will be displayed at the masthead; when the tide is falling, a *green* light will be exhibited at the masthead at night.

An additional 6 inches (0^m1) of depth is indicated, by day, by a 40 black ball at the centre of the yard.

The lights shown on the mast at night in the signals for certain depths are displayed at a lower level than the lights at the yardarms.

Signals shown from the radio mast at Ying-k'ou Navigation Office indicate the depths in the harbour. The yard is rigged in an east 45 and west direction, similarly to the yard at Bar signal station, and the same system of signals is used.

Tidal streams.—The ebb stream generally commences when the water level on the bar has fallen from one to 2 feet (0^m3 to 0^m6), and the flood stream after a corresponding rise of the tide. Outside the 50 bar the stream sets north-north-westward at the commencement of the flood, and passing through north, ends setting north-north-eastward. The tidal streams set obliquely across the bar, the flood stream setting northward, and the ebb stream southward, with a maximum rate of from 2 to 4 knots.

DEPTH SIGNALS.

Depth on bar in feet	BY DAY		AT NIGHT	
	West yard arm	East yard arm	West yard arm	East yard arm
8	● ●			
9	● ●			
10		●	○	
11	●	●	○	○
12	● ●	●	○ ○	
13	● ●	●	○ ○	○
14	● ●	●	○ ○	○
15		● ●	○ ○	○
16	●	● ●	○	○
17	● ●	● ●	○	○
18	● ●	● ●		○
19	● ●	● ●		○
20		● ●		○ ○
21	●	● ●		○ ○
22	● ●	● ●	○	○ ○
23	● ●	● ●	○	○ ○
24	● ●	● ●	○ ○	○ ○
25		● ●	○ ○	○ ○

Chart 2991.

It has been reported that the flood stream sets strongly across the West training wall on to the eastern bank of the river, and that during the ebb stream there is a set on to this wall.

Off Ying-k'ou (*Lat. 40° 41' N., Long. 122° 14' E.*) the tidal streams run up the river for from 4 to 5 hours, and down the river for from 7 to 8 hours; they may attain a rate of 6 knots. The effect of the wind on the water level is much the same as that on the bar. It is reported that with strong south to south-westerly winds high water occurs earlier, and that with strong north to east winds there may be practically no high water.

Dredging operations.—Whilst the dredger is at work she will display a black diamond shape at the masthead by day, and at night she will exhibit a *red* and a *green* light, 6 feet (1^m8) apart, disposed vertically; vessels entering or leaving the harbour and observing a dredger at work are to observe the following instructions:—

- (a) Vessels about to pass through the dredged channel are to display a black ball at the foremast head by day, and at night exhibit a *red* light not less than 6 feet (1^m8) above the light on the foremast; a long blast is to be sounded on the siren at a suitable distance, and the dredger is not to be approached until she has answered by sounding a long blast on her siren. If the dredger sounds several short blasts on her siren, vessels must stop immediately and remain stopped until she sounds a long blast.
- (b) Vessels of shallow draught must not pass through the dredged channel unless it is essential for them to do so.
- (c) Vessels must not pass the dredger within a distance of 75 yards (68^m6) and must reduce speed to a minimum.
- (d) If the dredger is working at night near the line of No. 4 leading lights, vessels passing her must do so on the line of those lights or eastward of that line.

Directions.—The light-vessel is the only mark for identifying the entrance to Liao ho, and it is often difficult to pick up this light-vessel, especially in the daytime, when there may be many vessels around waiting for a favourable tide; it has often happened that vessels who have not picked up the light-vessel have, whilst endeavouring to avoid the banks southward of the entrance, kept too far north-westward and have run on to the banks in that direction. A good plan, even for vessels coming from the direction of Taku, is to make the land considerably further southward, where there are better landmarks, and then proceed northward for the light-vessel; a useful landmark for this purpose is T'a shan, the summit of Ch'ang-hsing tao (page 495).

When entering the river care should be taken to avoid the obstruction and the 10-foot (3^m0) patch situated about 2½ and 2¾ miles west-south-westward, respectively, of Wall End beacon, and also not to confuse dredging and surveying beacons for those on the East training wall; beacons for dredging purposes are erected at various times and may not be removed when no longer required. The bar and river being subject to change, local knowledge is desirable.

It has been reported that between Middle Bank light-buoy and Yung-yuan chiao there were many rows of fishing stakes, some of which extended well into the fairway.

Charts 1256, 1262.

Chart 2991.

Port of Ying-k'ou.—**General remarks.**—The Port of Ying-k'ou is off the city of Ying-k'ou (Yingkow), which is situated on the southern bank of the river and about 2 miles above Yung-yuan chiao (*Lat.* 5 $40^{\circ} 42' N.$, *Long.* $122^{\circ} 10' E.$). The lower limit of the port is a line drawn 230° from a position on the northern bank about $3\frac{1}{2}$ cables west-north-westward of Ho-pei railway station, which is situated about $1\frac{1}{2}$ miles eastward of Yung-yuan chiao; the upper limit is a line drawn 230° from the front beacon of the south-eastern of the 10 two pairs of beacons situated on the eastern bank of the river about $2\frac{1}{2}$ miles north-eastward of the Customs flagstaff.

The bed of the river may be altered by silt brought down by floods, or, to some extent, by the tidal streams. It is reported that every year in July and August, after the floods, a shoal with a depth of 15 from 11 to 12 feet (3^m4 to 3^m7) forms off Jardine Matheson and Farmer wharves.

Less water was reported, in 1932, on the southern side of the river a short distance above the Customs house.

The banks of the river, being of mud and sand, are easily washed 20 away, and the various shipping companies have banded the plots belonging to them and have constructed wharves; apart from those of the Railway Company, however, these are somewhat primitive.

The port is closed from November 20th to April 10th on account of ice.

25 Vessels not exceeding 470 feet (143^m3) in length can enter the port from June to September, but in April, May, and October, the length must not exceed 425 feet (129^m5).

Directions for berthing.—Owing to the shelving nature of the mud bottom, vessels must lie at a distance of about 60 feet (18^m3) from the 30 wharves, the intervening space being subsequently bridged by pontoons and gangways; when berthed at this distance vessels up to 18 feet (5^m5) draught can use many of the wharves. The following procedure, which is adopted by the pilots, is recommended for vessels proceeding to the wharves:—

35 The berth is approached with slight headway and against the stream, with the ship's head converging about 10° on the wharf. The off-side anchor is let go when the vessel is exactly abreast her berthing position and nearly half a cable from the wharf. Cable is veered quickly to about 3 shackles; the vessel will then be approxi- 40 mately in her berthing position and wire hawsers can be passed to the shore. When the vessel is berthed a sampan will bring a wire hawser to the stern, by means of which the end of a permanent mooring cable may be hauled on board. These cables are secured to anchors laid well out in the river, and should be hauled taut and 45 secured; in some cases the positions of the anchor of the moorings, which are laid opposite all the main wharves, are indicated by a large white anchor painted on the wall of a building abreast the moorings.

Anchorage.—The anchorage off Ying-k'ou can accommodate 34 vessels up to about 4,500 tons. Vessels must moor in accordance 50 with the regulations. The bottom is soft mud, and the holding ground is not very good, but it is said to be best below the Custom house. Vessels anchoring should veer cable to 45 fathoms (82^m3); they should anchor in two lines, parallel to the bank and at a distance of not less than twice their own lengths, clear of the fairway.

Charts 1256, 1262.

Chart 2991.

Prohibited anchorage.—An area on the southern side of the river, off the Harbour west leading lights, is reserved for Police vessels. The eastern limit of this area is marked by one beacon, and the western limit by two beacons; each beacon consists of a black and white post surmounted by a triangle. 5

Harbour regulations.—The following are extracts from Harbour regulations which may still be in force:—

Anchorage.—(a) The anchorage, except for those vessels otherwise specified, is from abreast of the Middle Temple, about one mile below the Customs house to the eastern end of the Railway Company's wharf, about one mile above the Customs house. 10

(b) For vessels carrying mineral oil: As directed by the Harbour-master. 15

(c) For vessels carrying explosives and for quarantine purposes: One mile below the anchorage (a).

Vessels must receive a berth allocation from the Customs authorities before entering harbour.

Vessels must not shift berth without permission, except due to stress of weather or for the safety of the vessel. 20

Vessels about to enter harbour, carrying an excessive amount of dangerous cargo, must display, by day, flag B of the International Code of Signals; at night, a red light must be exhibited.

To summon assistance, vessels must sound their whistle, siren or fog horn continuously, and, by day, display flags NO of the International Code of Signals; at night, they must signal by star shells, rockets, etc. 25

Mud Dock.—H.M.S. *Algerine* passed the winter, from 14th November, 1901, until 28th March, 1902, in a mud dock, which had previously been dug, situated about a mile eastward of the former British Consulate. In excavating a mud dock the sides should slope at an angle of not more than 45° with the bottom. The dock should be dug a few feet deeper than the dock sill, and should be of sufficient width for the bilge keels to pass clear; this extra width is also necessary on account of the sides breaking away during the winter frosts. 30 35

The dock used by the *Algerine* was dug at right angles to the bank of the river; it is considered that the process of docking would be less difficult if the angle was 70°. The rate of the stream off the entrance to the dock was 4 knots at high water. 40

When using such a dock the vessel's draught should be reduced as much as possible, and the time of docking should be about a quarter of an hour before high water.

Town of Ying-k'ou.—The town extends for about 3 miles along the southern bank of the river, and is divided into two parts. The old and western part contains the Government offices, the Consulates, and most of the merchants' offices; the eastern part is the modern town built by the Japanese. The Customs house (*Lat.* 40° 41' N., *Long.* 122° 14' E.) is a large prominent building, with a flagstaff 100 feet (30m5) high, situated in the eastern part of the old town. In 1952 the population of Ying-k'ou was about 170,000. 45 50

Harbour facilities.—**Supplies.**—**Communications.**—Small repairs can be executed.

Charts 1256, 1262.

Chart 2991.

There are several hospitals.

Fresh provisions can be obtained, but they are not plentiful.

It was reported, in 1948, that the port was in a state of complete
5 disrepair, and that harbour facilities and supplies could not be relied
upon.

Ying-k'ou is connected to the Chinese railway system. There is
a regular communication by sea to Ta-lien, Shang-hai, and Hong
Kong, and also to Japan. The town is connected to the general
10 telegraph and telephone systems.

There is a radio station at Ying-k'ou, *see* page 39.

Storm signals.—Storm signals are displayed from the flagstaff of
the Customs house.

Radio D.F. station.—A radio D.F. station is situated about 3
15 cables eastward of the Customs house.

Trade.—In normal times, the principal exports are beans and their
products, millet, coal, and spirits ; imports are textiles, flour, sugar,
dye-stuffs and paraffin.

Climatic table.—*See* Chapter I, page 77.

Charts 1256, 1262.

CHAPTER X.

THE EASTERN SIDE OF YELLOW SEA.—QUELPART ISLAND ; THE SOUTHERN PART OF THE WESTERN COAST OF KOREA, FROM HAENAM GAK TO CH'ULP'O HANG.

Chart 104.

QUELPART ISLAND.—**General remarks.**—Quelpart island, known as Cheju do by the Koreans and as Saishū tō by the Japanese, is a large isolated island lying with its northern extremity situated about 47 miles southward of Haenam gak, the south-western point of Korea ; this island is described fully in the South and East coasts of Korea, East coast of Siberia, and Sea of Okhotsk Pilot, and, except for a few general remarks, only the western end is described here. 5

Halla san (Mount Auckland) towers up in the centre of the island, far above any other mountains, and has two peaks ; the western, 10 6,384 feet (1,945^m8) high, is a precipitous wall of rock, whilst the eastern, 6,328 feet (1,928^m8) high, is somewhat sloping ; between these two peaks is a crater, the bottom of which is filled with fresh water, forming a circular lake about one cable in diameter. There are dense forests to about halfway up the mountain side, and above these there 15 is a sparse growth of stunted trees ; *see* view A on chart 104 and views facing page 510. About 3 miles north-westward of Halla san, there is a sharp, wooded peak 3,857 feet (1,175^m8) high, which is very prominent from north-eastward (*Lat.* 33° 23' N., *Long.* 126° 30' E.).

The entire surface of the island being formed of volcanic rock, most of the rain is absorbed, forming subterranean streams, which gush out between rocks in various places on the coasts. The rivers mostly dry up, and usually exist only as water-courses, but as soon as rain falls they suddenly become raging torrents ; only a few rivers flow throughout the year. 25

The villages are built mainly in two lines around Halla san, one line being along the coast, and the other round the foot of the mountains. The coastal inhabitants are partly fishermen and partly peasants ; the remainder are engaged in agriculture and rearing cattle and horses. 30

Communications.—There is communication by sea from Cheju (Saishiyū) and from other small ports of the island with Korea and Japan, but as there are no secure anchorages round the island for other than small craft, the weather sometimes prevents vessels from calling. 35

There is a telephone system on the island.

Charts 3480, 1262, 2347.

Chart 104.

South-western extremity of Quelpart island.—Punam gak (Loney bluff), situated at the south-western end of Quelpart island, is a small peninsula with mostly high and precipitous cliffs, rising to an elevation of 340 feet (103^m6); *see* view below.



*Punam gak,
bearing 081°, 3 miles.
(Original dated 1911.)*

Sanbang (Sanbo) san, 1,274 feet (388^m3) high, rises precipitously from the coast about 2½ miles north-north-eastward of Punam gak, and is the most conspicuous landmark in the western part of Quelpart island. The remainder of the land in the vicinity of Punam gak is flat and cultivated.

Off-lying islands and dangers.—Kap'a do (Barlow island) situated about 1½ miles south-south-westward of Punam gak, is a flat, inhabited island, 55 feet (16^m8) high, surrounded by reefs and rocks, some of which dry, and which extend about 4 cables from the south-western side. A detached reef, with a depth of 3¼ fathoms (6^m9) over it, lies about 4 cables southward of the southern point of the island, and some detached reefs, which dry, lie about the same distance south-eastward of this point. A rock, 8 feet (2^m4) high, lies about 7 cables north-eastward of the eastern point of Kap'a do, and another rock, 5 feet (1^m5) high, lies about 3 cables south-westward of it; foul ground extends about half a mile northward and three-quarters of a mile southward from the 8-foot (2^m4) rock. An isolated 4¼-fathom (7^m8) patch lies about a quarter of a mile northward of the middle of the channel between Kap'a do and the coast of Quelpart island northward.

Samarang rocks, situated about 1½ miles west-north-westward of Kap'a do, consist of three rocks, which dry about 9 feet (2^m7); a reef extends about 2 cables northward and southward from these rocks, and there are depths of less than 10 fathoms (18^m3) within a distance of about 3 cables of them.

Mara do (to) lies about 2½ miles southward of Kap'a do, and has a perpendicular rocky wall on its eastern side rising to an elevation of 117 feet (35^m7); there are some dwellings on its western side. There are depths of from 7 to 8 fathoms (12^m8 to 14^m6) about a quarter of a mile off its northern and southern extremities, but elsewhere the island is steep-to. The channel between Mara do and the foul ground off the southern side of Kap'a do is clear and deep, but the tidal streams are strong and there is generally a tide race.

Light.—**Fog signal.**—**Radio beacon.**—**Radio D.F. station.**—A light is exhibited, at an elevation of 139 feet (42^m4), from a white circular brick tower, 26 feet (7^m9) in height, situated on the eastern side of Mara do (*Lat.* 33° 07' N., *Long.* 126° 15' E.).

A fog signal is sounded from the lighthouse. There is a radio-beacon and a radio D.F. station.

Out-lying dangers.—Discoloured water was reported, in 1950, about 14 miles south-south-westward of Mara do.

Chart 104.

Shoal water, which has not been examined, was reported, in 1950, about 31 miles south-eastward of Mara do.

South-western side of Quelpart island.—Islets and Dangers.—
Anchorage.—Mosul p'o is a small bay situated about $2\frac{1}{2}$ miles north-
westward of Punam gak, and it affords shelter to fishing vessels, 5
protected by a rocky ledge and a breakwater. A flourishing trade
is carried on here, and it is a port of call for the regular steamship
lines. Fresh water gushes out on the shore of the bay; provisions
can be obtained. An isolated, conical hill, 602 feet (183^m5) high, is 10
situated about one mile northward of the head of the bay and is
very prominent.

The coast for about 4 miles north-westward of Punam gak is indented by several small bays, but, except for Mosul p'o, they are all occupied by reefs which dry; for a further 5 miles north-westward 15
there are practically no indentations, and the coast consists of boulders. A bank, with a depth of 8 fathoms (14^m6) over its outer edge, extends about one mile offshore about 6 miles north-westward of Punam gak. Kosan ak is a prominent rocky peak, 475 feet (144^m8) high, situated on the western extremity of Quelpart island and about 20
9 miles north-westward of Punam gak; Kosan-ni, the largest village in the neighbourhood, is situated at the south-eastern foot of Kosan ak.

There are two rocks lying nearly a quarter of a mile offshore south-westward of Kosan ak; the outer rock is 3 feet (0^m9) high.

Ch'agwi do (Shakui to) is the name given to two islets lying west- 25
ward of Kosan ak. Eden islet, the outer one, lies about three-quarters of a mile offshore and is 199 feet (60^m7) high and covered with grass; Wooley islet, the eastern islet, is 137 feet (41^m8) high and is rocky. The depths between these two islets are irregular, and a reef extends into the channel from the western side of Wooley islet; 30
a rock, which dries, obstructs the channel between Wooley islet and the main coast. Small vessels with local knowledge can obtain temporary anchorage off the coast close northward or southward of Eden islet.

Tidal streams.—The tidal streams off the south-western side of 35
Quelpart island run parallel to the coast; they are strongest in the vicinity of Mara do, where their maximum rate is about 3 knots. In a position about $3\frac{1}{2}$ miles south-south-westward of Ch'agwi do, the north-going stream runs from about 4 hours after the time of low water at Yangtze approaches (Admiralty Tide Tables Standard Port) 40
to about 4 hours after the time of high water.

North-western side of Quelpart island.—Island and dangers.—
Anchorage.—Tidal streams.—The coast between Kosan ak and a point situated about $5\frac{1}{2}$ miles north-north-eastward is fringed by rocky ledges, but there are depths of 5 fathoms (9^m1) about 2 cables 45
offshore, and about 10 fathoms (18^m3) three-quarters of a mile offshore. Between the above point and a point situated nearly $3\frac{1}{2}$ miles north-north-eastward, the coast is rocky and irregular, except for two white sandy beaches, and is fringed by rocky ledges which extend from one to $3\frac{1}{2}$ cables offshore; there are several villages 50
along this part of the coast, the principal being Hallim-ni, situated about 8 miles north-eastward of Kosan ak, where there is a post office and a canning factory.

Piyang do (Piyan to) lies nearly 7 miles north-eastward of Kosan ak

Chart 104.

and about three-quarters of a mile offshore ; it is a prominent islet covered with grass, and has a basin-shaped summit, on the outer edge of which are four peaks, the highest, on the northern side, being 363 feet (110^m6) high. The southern side of the island is somewhat flat and there is a small village ; a cove on the south-eastern side affords shelter to boats, except with southerly winds. There is foul ground all round Piyang do, except on the north-eastern side, and this extends about three-quarters of a mile from the northern side of the island, and 6 cables from the western side ; there are some prominent rocks above water close to the western coast. The passage between Piyang do (*Lat.* 33° 25' N., *Long.* 126° 13' E.) and the mainland is narrowed by the shoals extending from either side to a breadth of about 2 cables, with depths of from 3 to 4½ fathoms (5^m5 to 7^m8) over them, and it is only navigable for small vessels with local knowledge.

Piyangdo myoji is the name given to the anchorage southward and eastward of Piyang do ; the bottom is rocky and uneven in parts, and anchors are liable to foul. The southern anchorage is about midway between the southern side of Piyang do and the main coast southward, in depths of from about 5 to 9 fathoms (9^m1 to 16^m5), sand and shells ; this anchorage is not good with winds from between south and north-west. The eastern anchorage is about midway between the eastern coast of Piyang do and the coast of the main island eastward, in depths of from 7 to 8 fathoms (12^m8 to 14^m6), sand ; this anchorage is bad with northerly winds. The tidal streams set north-eastward and south-westward ; near Piyang do they have a maximum rate of about 2½ knots, and turn to north-eastward and south-westward at about 4 hours after the times of low and high water, respectively, at Yangtze approaches (Admiralty Tide Tables Standard Port).

There is a low islet lying close to the coast, and connected to it by a rocky ledge, about half a mile northward of Hallim-ni. A rocky ledge, with a breakwater on it, extends about 4 cables southward from the western end of this islet, and another breakwater extends about one cable north-westward from Hallim-ni ; the passage between the heads of these two breakwaters is about one cable wide, and the area enclosed by them forms a safe harbour for small craft.

Piyangdo myoji is visited by coastal steamers. Storm signals are displayed at Hallim-ni ; see page 28. Fresh provisions are obtainable.

Aewöl gak (Robertson point) is situated about 4 miles north-eastward of Hallim-ni. A hill, 563 feet (171^m6) high, with an old beacon on its summit, is situated about 1½ miles east-south-eastward of Aewöl gak and half a mile inland. The coast eastward of Aewöl gak is described in the South and East coasts of Korea, East coast of Siberia, and Sea of Okhotsk Pilot.

Lights.—A light is exhibited from both the northern and southern extremities of the northern breakwater, and also from the head of the southern breakwater at Hallim-ni ; each of these three lights is exhibited, at an elevation of 19 feet (5^m8), from an iron column 14 feet (4^m3) in height, with a concrete base.

Chart 3365.

Islet and rocks northward of Quelpart island.—Haeam sō (Sea rock) lies about 12 miles northward of Aewöl gak, and is a steep-to pinnacle rock, 169 feet (51^m5) high ; see view facing page 511.

Hwa do (Flower islet), situated about 4½ miles north-eastward of

To face page 510.



Hwa do
(Flower I.),
Huam sô
(Sea rock).

Halla san (Mt. Auckland),
bearing 124°, about 45 miles.

Quelpart island from north-westward.
(Original dated 1898).

Piyang do
(Plyan to).

Halla san (Mt. Auckland),
bearing 066°, about 29 miles.



Ch'agwi do
(Shakui to).

Sanbang san
(Sanbo san)

Puram g'ê
(Loney bluff).

Kap'a do
(Barlow I.).

Quelpart island from south-westward.
(Original dated 1898).



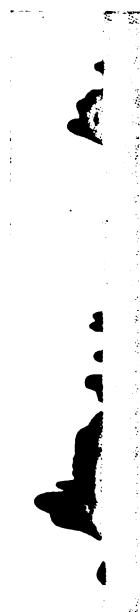
*Hucam só (Sea rock),
bearing 262°, about 4 miles.*



089°, 1½ miles.



291°, 1½ miles.



*Sudak to (Hott rock),
bearing 045°, 8½ miles.*

*Chikkyō só (Ninepin rock),
bearing 050°, 5½ miles.*



*Chikkei do (Ripple island),
bearing 040°, 9 miles.*



*Changu do (Maisonnette),
bearing 045°, 14½ miles.*

Islets in Ch'uja kundo (group) and vicinity.
(Originals dated 1933.)

Chart 3365.

Haeam sŏ, has a flat summit 281 feet (85^m6) high ; there are depths of over 20 fathoms (36^m6) at a distance of about one cable around this islet, except on the western side, which shelves more gradually ; see views facing this page. 5

Nakano se, situated about 4½ miles north-north-westward of Hwa do, is a rock with a depth of 3½ fathoms (5^m9) over it.

CH'UJA KUNDO.—Ch'uja kundo (group) consists of a number of islands and rocky islets lying from 24 to 33 miles northward of Aewŏl gak. There is foul ground around many of the islets, and vessels without local knowledge should not attempt to pass through the group except in case of necessity. See view facing page 512. 10

Chŏlmyŏng sŏ (Ninepin rock), the southernmost of the group is a conical rock, 159 feet (48^m5) high ; there are heavy tide-rips within a distance of a mile north-eastward of this rock ; see view facing this page. Jino se, a steep-to rock, with a depth of 6 fathoms (11^m0) over it, lies about 7 cables south-eastward of Chŏlmyŏng sŏ. 15

Sudŏk to (Bott rock) lies about 2½ miles north-eastward of Chŏlmyŏng sŏ and is prominent ; its northern side consists of precipitous cliffs rising to an elevation of 415 feet (126^m5) ; see view facing this page. About 1½ miles westward of Sudŏk to is Oegwak to, 110 feet (33^m5) high, and a 3½-fathom (6^m4) patch lies about 3 cables south-eastward of it. Ch'ong do (*Lat.* 33° 55' N., *Long.* 126° 19' E.), situated about three-quarters of a mile north-westward of Sudŏk to, is 349 feet (106^m4) high. 25

Hach'uja do (Thornton island), the largest and highest island of the group, lies with its southern extremity nearly one mile northward of Ch'ong do ; its summit, situated in the middle of the northern part of the island, is 533 feet (152^m5) high. Foul ground extends about 3 cables from the south-eastern point of Hach'uja do, and a reef, with a depth of 2 fathoms (3^m7) over it, lies about 6 cables south-eastward of this point. Sŏm do, a rock, 212 feet (64^m6) high, lies about 2 cables off the middle of the western coast, and a rock, which dries 3 feet (0^m9), lies about 6 cables west-south-westward of the western extremity of the island ; some rocks, one of which is 51 feet (15^m5) high, lie about midway between these two rocks. There are several rocks off the northern side of the island. 35

Sangch'uja do (Sober island), the second largest island of the group, is separated from the western extremity of Hach'uja do by a narrow channel, and is 484 feet (147^m5) high. 40

Pang sŏ (South Black rock), the south-easternmost rock of Ch'uja kundo, lies about 3½ miles south-eastward of the eastern point of Hach'uja do and is 44 feet (13^m4) high. Ubi am (North Black rock), lying about 2 miles north-north-westward of Pang sŏ, is 41 feet (12^m5) high, and U do, situated about one mile northward of Ubi am, is 192 feet (58^m5) high. Mang do (Remi islet), the north-easternmost islet of the group, lies about 1½ miles north-north-eastward of Ubi am and is 215 feet (65^m5) high. 45

Hoenggan do (Whale island) lies about 2 miles west-north-westward of Mang do and is the northernmost island of the group ; it has two peaks, the eastern and higher attaining an elevation of 507 feet (154^m5), and there is a village between them. Nok sŏ, a rock, 37 feet (11^m3) high, lies about one mile westward of the western point of 50

Charts 104, 3480, 1262, 2347.

Chart 3365.

Hoenggan do. There are several other islets and rocks between Hoenggan do and the two largest islands, and the positions of these are best seen on the chart; among them are Hūkkōm do and Suryōng do, 359 and 336 feet (109^m4 and 102^m4) high, respectively.

Chikku do (Ripple island), the north-westernmost island of the group, is 346 feet (105^m5) high and lies about 4 miles west-south-westward of Hoenggan do; *see* view facing page 511.

Anchorage.—**Light.**—Sangch'uja hang, a small bay on the eastern side of Sangch'uja do, affords good anchorage for small vessels with local knowledge, and it is visited regularly by vessels from Mokp'o (Mokuho) in Korea. Two villages are situated on the southern and northern shores of the bay, respectively, and there is a post office at the northern one.

A light is exhibited, at an elevation of 43 feet (13^m1), from a black circular concrete structure, 42 feet (12^m8) in height, situated on a rock on the southern side of the entrance to Sangch'uja hang.

Anchorage can be obtained, by vessels with local knowledge, about half a mile off the northern coast of Hach'uja do, in depths of from 11 to 15 fathoms (20^m1 to 27^m4), with the summit of this island bearing about 180°, but as the bottom is very rocky, this cannot be considered a good anchorage. A better position is off the eastern coast of this island and south-eastward of its summit, in depths of from 10 to 11 fathoms (18^m3 to 20^m1) sand.

Tidal streams.—The tidal streams in general set north-westward from about 4 hours after low water to about 4 hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and south-eastward from about 4 hours after high water to about 4 hours after low water; the maximum rate at spring tides is about 2½ knots, but in the narrow channels between the various islands of the group they may attain a rate of 5 knots, and in such cases heavy overfalls occur.

Eddies are experienced between Hoenggan do and Mang do (*Lat.* 34° 00' N., *Long.* 126° 23' E.), and tide-rips are common.

Local magnetic anomaly.—A local magnetic anomaly, with a deflection of the needle westward, has been reported north-westward of Ch'uja kundo.

Out-lying islet and danger.—Changsu do (Maisonneuve) lies about 12 miles eastward of Pang sō, and has a flat, thickly wooded summit, 234 feet (71^m3) high; except on the northern side there are vertical cliffs around the islet, which is steep-to. There are a couple of dwellings on the northern side, which are stated to be occupied temporarily during summer. *See* view facing page 511.

Chart 3393.

Posa ch'o (Fukusa shō), situated about 7½ miles north-westward of Chikku do, has two rocky heads on which the sea breaks heavily; the eastern head dries 4 feet (1^m2).

Charts 1558, plan of Shoan kō, and 3365.

SOAN KUNDO.—Soan kundo (Shoan guntō) lies north-eastward of Ch'uja kundo and southward of Haenam gak, the south-western point of Korea, and consists of the three large islands Pogil to (Hokitsu tō), Nohwa do (Roka tō), and Soan do (Shoan tō), several smaller islands and islets, and numerous rocks. *See* view facing page 513.

Charts 104, 3480, 1262, 2347.

To face page 512.

Chimvong sô
(Ninepin rock).



Hwa do
(Flower I.).

Pang sô
(South Black Rock).

Sudôk to
(Boat rock),
bearing 240°, 7 miles.



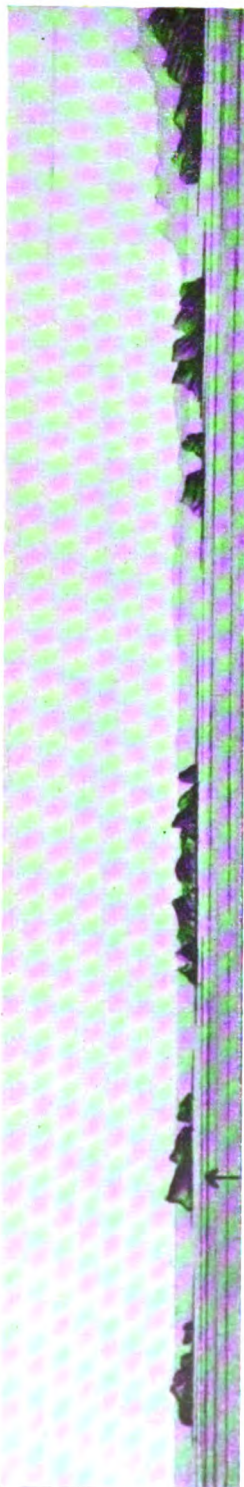
Sudôk to.

Ch'ong do.

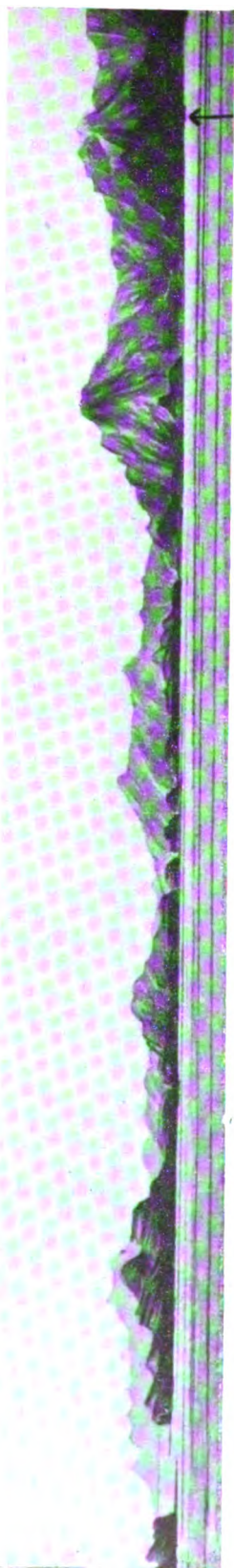


Hwanggam do
(White I.).

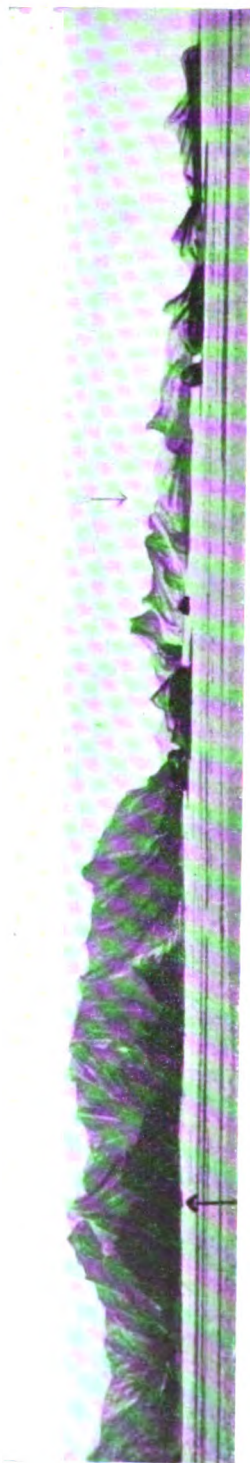
View, in three parts, of Ch'uja kundo (group).
(Original dated 1884).



Omo kundo (Gaim's guntō).



Pojuk bak (Hochiku baku),
bearing 082°, 5 miles.



S.W. entrance to
Soan hang (Shoan kō).

View, in three parts, of Soan kundo (Shoan guntō) from south-westward.
(Originals dated 1863).

Chaji do (Shashi tō),
Lt. Ho, not shown.

Chart 1558, plan of Shoon kō.

Chaji do.—Islets and dangers.—Chaji do (Shashi tō), sometimes known as Hangmun do, the southernmost island of Soan kundo, lies nearly 11 miles northward of Changsu do; its coasts are mostly steep, with occasional shingle beaches, and the south-eastern and north-eastern points of the island are cliffy. Pyōngam (Heigan) san, the summit of the island, is situated on the southern side, and is a sharp peak 566 feet (172^m5) high. Chaji do is wooded, and it is an excellent landmark for vessels passing southward of the group. The south-western and south-eastern points of Chaji do are named Yongdu-am (Ryūtōgan) and Pyōng-am (Heigan), respectively. Poksaeng do (Bokusei tō), 238 feet (72^m5) high, lies about 4 cables westward of the northern end of Chaji do, and has perpendicular cliffs on its southern side; a shoal extends a short distance from its northern side.

Chaji t'oi (Shashi tai) is a shoal of sand and shells, with a least depth of 20 feet (6^m1) over it, lying about 6 cables north-eastward of the north-eastern extremity of Chaji do.

Lights.—Fog signal.—Radiobeacon.—Radio D.F. station.—A light is exhibited, at an elevation of 314 feet (95^m7), from a white circular concrete tower, 27 feet (8^m2) in height, situated on the south-eastern extremity of Chaji do. An auxiliary light is exhibited from the same tower. A fog signal is sounded from the lighthouse, and a radiobeacon is operated.

There is a radio D.F. station on Chaji do. Operation was suspended in 1949.

Out-lying dangers.—Chulun ch'o (Izumo shō) is a pinnacle rock, awash, lying about 4½ miles west-south-westward of Chaji do; with strong winds and tidal streams the sea breaks over it. Kahak (Gakaku) san (page 515), in line with Poksaeng do, bearing about 058°, leads fully half a mile north-westward of this danger. At night it is covered by the auxiliary red light of Chaji do (*Lat. 34° 06' N., Long. 126° 36' E.*).

Chart 3365.

A bank, with a depth of 10 fathoms (18^m3) over it, lies about 2½ miles south-south-westward of Chaji do.

Chart 1558, plan of Shoon kō.

Pogil to.—Islands and dangers.—Pogil to (Hokitsu tō), the south-western island of the group, lies with Pojuk kak (Hochiku kaku), its south-western extremity, nearly 4 miles west-north-westward of Chaji do; it is densely wooded and has many sharp peaks. Pogil to is divided into two parts, joined together by a low, narrow neck about 3 cables in length. The western part is hilly. Songjin bong (Shōshin hō), the summit of the island, 1,416 feet (431^m6) high, is situated nearly 1½ miles north-eastward of Pojuk kak (*Lat. 34° 07' N., Long. 126° 31' E.*); the latter has a prominent hill on it, 638 feet (194^m5) high. Mangwōl bong (Bōgetsu hō), situated about three-quarters of a mile northward of Pojuk kak, is a prominent rocky peak, 1,205 feet (367^m2) high. Mangwōl gak (Bōgetsu kaku) lies about one mile north-north-westward of Pojuk kak. P'ajang gak (Hachō kaku), Taepunggumi (Taifukyūmi), and Kansog-am (Sensekigan) are points on the western coast of Pogil to between Mangwōl gak and Tūnmung gak (Tōbun kaku), the northern extremity of the island, situated about 3 miles north-eastward.

Charts 104, 3480, 1262, 2347.

Chart 1558, plan of Shoan kō.

Several islets, rocks, and reefs lie within a distance of one mile from the western coast of Pogil to, and the positions of these are best seen on the chart ; among them are Kal to (Ka tō), Ongmae do
 5 (Gyokubai tō), Midūk to (Mitoku tō), Song do (Jō tō), and Sa do (Sha tō), with heights of from 31 to 172 feet (9^m4 to 52^m4). Song do (Shō tō), 18 feet (5^m5) high, lies about half a mile west-south-westward of Tūnmung gak. Ch'i do (Ya tō) consists of two rocky islets, the southern of which is 156 feet (47^m5) high and lies about half a mile
 10 south-eastward of Pojuk kak ; the tidal streams attain a rate of from 3½ to 4 knots in the vicinity of these islets. Yejak to (Reisaku tō) lies close off the coast about 2½ miles east-north-eastward of Pojuk kak, and has a sharp summit 471 feet (143^m6) high ; a 21-foot (6^m4) patch lies about 3 cables westward of the south-western point of
 15 Yejak to, and So do (Shō tō), an islet 208 feet (63^m4) high, lies close off the south-eastern point of Yejak to and is connected to it by a reef.

The eastern part of Pogil to is indented by several bays, but those on the northern side are entirely occupied by mud flats which
 20 dry. Puch'i gak (Fuji kaku), the southern extremity of this part, has a very prominent rocky hill on it. Hang do (Kō tō), 146 feet (44^m5) high, lies at the head of a bay between Puch'i gak and Changhang gak (Chōkō kaku), situated about 1½ miles west-north-westward ; Nam do (Nan shō), 16 feet (4^m9) high, lies off its south-eastern side. Ki
 25 do (tō), 221 feet (67^m4) high, lies about 7 cables westward of Puch'i gak (*Lat. 34° 09' N., Long. 126° 36' E.*), and bears some resemblance to a horse lying down, with its head raised and facing eastward ; An do (tō) is a saddle-shaped islet 107 feet (32^m6) high, lying about half a mile southward of Ki do. Sōam gak (Shogan kaku), the eastern
 30 point of Pogil to, has a prominent square boulder on it ; Saam gak (Shagan kaku) lies between Sōam gak and Puch'i gak. P'ojong (Hachō) san, 339 feet (133^m8) high, is a sharp peak situated about 4 cables north-westward of Sōam gak.

Tongch'u do (Tōshū tō), 54 feet (16^m5) high, lies off the northern
 35 coast about 1½ miles west-north-westward of Sōam gak.

Nohwa do.—Islands.—Tidal streams.—Nohwa do (Roka tō) lies northward of Pogil to, and is separated from it by Sadu sudo (Datō suidō), a narrow channel only suitable for small craft. There are depths of only about 1½ fathoms (2^m7) in the approach to the western
 40 entrance to this channel, and the eastern entrance is encumbered with islets. Kangnaesan gak (Kyakuraian kaku) is the northern entrance point of the western entrance to Sadu sudo, and Nangam gak (Rōgan kaku) lies about one mile further south-eastward. Changsa do (Chōda tō), 231 feet (70^m4) high, lies southward of Nangam gak.
 45 The tidal streams in Sadu sudo attain a rate of from 2½ to 2½ knots.

The hills on Nohwa do vary little in elevation, and, being almost devoid of vegetation, this island is readily identified from the other two large islands of the group ; the summit, 520 feet (158^m5) high, is near Nangam gak. The coasts are indented by numerous bays.
 50 Toch'ongni p'o (Tochōri ho) and Yongsu p'o (Ryūsui ho) are two large bays on the south-eastern side, but they are entirely occupied by mud banks which dry. Kuyong do (Kyūyō tō), 93 feet (28^m3) high, Chō do (Cho tō), 162 feet (49^m4) high, and Sōk to (Seki tō), 110 feet (33^m5) high, are situated in Toch'ongni p'o. Taego do (Daiko tō),

Charts 3365, 104, 3480, 1262, 2347.

Chart 1558, plan of Shoan kō.

113 feet (34^m4) high, and Sogo do (Shōko tō), 67 feet (20^m4) high, are situated in Yongsu p'o.

Norok to (Rōroku tō) lies on the northern side of the western entrance to Sadu sudo, and is connected to the south-western end of Nohwa do by a sandbank which dries; this island has a sharp summit 458 feet (139^m6) high, and is very prominent.

Mirari p'o (Birari ho) is a small bay situated about one mile north-eastward of Norok to. Song do (Shō tō), 44 feet (13^m4) high, lies nearly 4 cables offshore about one mile north-north-eastward of Norok to.

Chart 3365.

Yōngsanam mal (*Lat. 34° 14' N., Long. 126° 33' E.*) is the extremity of an irregular peninsula extending about one mile north-westward from the north-western side of Nohwa do. Tondū dan is a point situated about 2½ miles east-south-eastward of Yōngsanam mal.

Chart 1558, plan of Shoan kō.

Soan do.—Islets and dangers.—Anchorages.—Soan do (Shoan tō), the eastern of the three large islands of Soan kundo, is divided into two parts, north and south, by a low, narrow neck. Kahak (Gakaku) san, the summit of the island, is situated at the northern end of the southern part and is 1,193 feet (363^m6) high; Puhūng (Fukyō) san is a prominent rocky peak, 740 feet (225^m5) high, situated about one mile southward of Kahak san. Ch'ōngbyōn bong (Seihen ho), the highest peak in the northern part, is situated near the eastern end, and is a regular cone 1,107 feet (337^m4) high.

Tonam gak (Tongan kaku), the western point of Soan do, lies in the middle of the southern part of the island. Such'igumi gak (Suijikyūmi kaku) and Hūktok sō (Kokutoku sho), 7 feet (2^m1) high, are situated, respectively, about half a mile and one mile southward of Tonam gak.

Chinsanni p'o (Chinsanri ho), situated on the south-western side of Soan do, affords sheltered anchorage from all except southerly winds, and out of the strength of the tidal streams; there are depths of about 3½ fathoms (6^m9), mud, in about the middle of the bay. Sangdu sō (Reimōtai gan), 23 feet (7^m0) high, lies about one cable off the eastern entrance point of the bay, and Nong sō (Rō sho) lies close off the western entrance point.

Yegangch'i gak (Kyomoji kaku) is the southern extremity of Soan do. Tae sō (Dai sho), 38 feet (11^m6) high, lies about 2 cables offshore close eastward of Yegangch'i gak, and Ich'ui ch'o (Ibuki shō), a rock with a depth of 4 feet (1^m2) over it, lies about a quarter of a mile offshore about one mile further north-north-eastward.

Pua gak (Fuji kaku) is the eastern extremity of a peninsula which extends from the eastern coast of Soan do, and is a cliffy point; a reef, which dries one foot (0^m3), lies nearly 2 cables eastward of this point. Choyak kak (Joraku kaku) lies about half a mile southward of Pua gak (*Lat. 34° 09' N., Long. 126° 41' E.*), and Hang sō (Kō sho), 93 feet (28^m3) high, lies close inshore between.

Ch'ōngbyōn p'o (Seihen ho), the bay between Pua gak and Ch'ōngbyōn gak (Seihen kaku), lying nearly 2 miles northward, affords temporary anchorage except with easterly winds.

Tamch'osō gak (Tansōsho kaku) is the low northern extremity of Soan do, and terminates southward in a shingle spit; it lies about 2

Charts 104, 3480, 1262, 2347.

Chart 1558, plan of Shoan kō.

miles north-westward of Ch'ōngbyōn gak, with Cham do (Ten tō) nearly midway between. Tae sō (Dai sho) is a rock, 8 feet (2^m4) high, lying on a spit which extends about a quarter of a mile northward
 5 from Tamch'osō gak. Ssi sō (Kakushi sho), situated nearly one mile northward of Tae sō, is a rock which dries 12 feet (3^m7).

Senho du and Oji gak are points on the western side of the northern part of Soan do; the former lies about one mile south-westward of Tae sō, and the latter about half a mile further southward. Inami
 10 p'o (Rinanri ho) is a small bay in the same vicinity.

Soan hang.—Islets and dangers.—Tidal streams.—Anchorage.—

Soan hang (Shoan kō) is situated in the narrow channel which runs in a north and south direction between Soan do, on the eastern side, and Pogil to and Nohwa do, on the western side; between the shoal
 15 flats which extend from both sides there are depths of from 5 to 16 fathoms (9^m1 to 29^m3) over the greater part.

The harbour can be entered from southward, westward, or northward. The southern entrance, between Tonam gak and the eastern extremity of Pugil to, has depths of from 5 to 10 fathoms (9^m1 to
 20 18^m3), and the tidal streams attain a rate of from 1½ to 2 knots. The western entrance is through Sadu sudo (page 514). The northern entrance lies between Tae sō and Ku do (Kyū tō), situated about 4 cables north-westward, and has a least depth of 7 fathoms (12^m8) in the fairway; the maximum rate of the tidal streams is about 1½
 25 knots. Ku do has a dome-shaped summit, 346 feet (105^m5) high, and the southern side, as well as the summit, is densely wooded.

The shoal flat which extends from the western side of Soan do is steep-to. Besides Ku do, there are several islets on the western side of the northern part of the harbour; these include Hang do (Kō tō),
 30 93 feet (28^m3) high, Sogu do (Shōkyū tō), 77 feet (23^m5) high, Song do (Shō tō), 19 feet (5^m8) high, Haquyong do (Kakyūyō tō), 54 feet (16^m5) high, Yuk to (Riku tō), 44 feet (13^m4) high, and Sōk to (Seki tō), 38 feet (11^m6) high; Sōk to, the southernmost of these, lies nearly 1½ miles northward of Sōam gak (page 514). A rock, which dries 3 feet
 35 (0^m9), lies about one cable south-eastward of Sōk to, and a rock, with a depth of 23 feet (7^m0) over it, lies about 4 cables north-eastward of this islet. A rock, with a depth of 17 feet (5^m2) over it, lies about 1½ cables eastward of Sōam gak (*Lat.* 34° 09' N., *Long.* 126° 38' E.).

Pal to (Hatsu tō), 130 feet (39^m6) high, lies about half a mile west-
 40 south-westward of Sōk to, to which it is joined by a drying bank.

Owing to the confined space, Soan hang is only suitable for small vessels. There is anchorage in the middle of the harbour in a depth of about 9 fathoms (16^m5), mud, with Sōk to bearing 294°, distant 4½
 45 cables. During winter, with strong northerly winds, this anchorage is unsafe, and it is better then to anchor in the vicinity of Yejak to (page 514).

Directions.—A vessel making for the southern entrance of Soan hang from westward will pass northward of Chulun ch'o (page 513) by keeping Kahak san bearing not less than 060° and open northward
 50 of Poksaeng do; course should then be shaped to pass between Poksaeng do and So do, which lies about three-quarters of a mile northward. A vessel making for the southern entrance of Soan hang from southward, and passing eastward of Chaji do, should keep the summit of Ku do bearing not more than 009°, and open eastward of

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Chart 1558, plan of Shoan kō.

Sōam gak (*Lat. 34° 09' N., Long. 126° 38' E.*), so as to pass clear eastward of Chaji t'oi. A mid-channel course should then be steered through the entrance; the summit of Ku do in line with Senho du, bearing 004°, leads eastward of the 17-foot (4^m9) rock off Sōam gak, 6 and to the anchorage.

A vessel making for the northern entrance of Soan hang should pass between Ssi sō and Tae sō by keeping Kudan (Kyūdan) san, a prominent hill with a sharp summit 500 feet (152^m4) high, situated near the eastern extremity of Nohwa do, in line with the summit of 10 Ku do, bearing 263°; Ssi sō will be identified by the time the rear mark of this alignment has disappeared. When P'ojong san (page 514) is in line with Senho du, bearing about 205°, a vessel can pass through the entrance by steering for the eastern point of Haquyong do, bearing 215°. When nearing Senho du a more southerly course 15 should be steered, passing eastward of the rock, with a depth of 23 feet (7^m0) over it, lying about 4 cables north-eastward of Sōk to. *Chart 3365.*

Islands and dangers northward of Nohwa do.—Tidal streams.—Hoenggan do (Craig Nicoll), 663 feet (202^m1) high, the northernmost 20 island of Soan kundo, is separated from the northern side of Nohwa do by a channel about 3 cables wide, and can be readily identified; from the eastward it appears as a flat ridge, terminating southward in a steep, rugged slope which ends in a cliff nearly 400 feet (121^m9) high.

Yongjōu ch'ō (Tatsuta), situated nearly 1½ miles eastward of 25 Hoenggan do, is a pinnacle rock which dries one foot (0^m3); when the tidal streams are strong there are heavy overfalls over the rock, but at slack water it is not easily seen, and it is, therefore, extremely dangerous.

An islet, 71 feet (21^m6) high, lies about half a mile westward of 30 Hoenggan do, and about three-quarters of a mile further westward is Masak to, an island 212 feet (64^m6) high; a shoal, with a least depth of 4 fathoms (7^m3) over it, lies about 3 cables north-north-eastward of the eastern point of Masak to (*Lat. 34° 15' N., Long. 126° 34' E.*).

The channel, bounded southward by the northern coast of Nohwa 35 do, and northward by Hoenggan do, and Masak to, has depths of from 11 to 17 fathoms (20^m1 to 31^m1) in the fairway. Changgu do, 137 feet (41^m8) high, is the eastern of two small islets lying in the eastern entrance to this channel. The tidal streams set westward with the rising tide, and eastward with the falling tide; the maximum 40 rate is 4½ knots.

Chart 1558, plan of Shoan kō.

Islands and dangers westward of Nohwa do.—A shoal flat extends about 3½ miles north-westward from Pugil to, and nearly 4 miles westward from Nohwa do; there are several islands and rocks on this 45 flat, the largest being Ing do (Jō tō), 504 feet (153^m6) high.

Nojaam gak (Rosekigan kaku) is the northern extremity of Ing do; Song do (Shō tō), 38 feet (11^m6) high, lies off its north-eastern point, and Song do (Shō tō) and On sō (shō), 41 and 4 feet (12^m5 and 1^m2) 50 high, respectively, lie off its south-eastern extremity.

Maan do (Baan tō), 146 feet (44^m5) high, and Hujanggu do (Gōchō-kyū tō), 202 feet (61^m6) high, lie, respectively, northward and north-westward of Ing do. Sonae doe (Seijo tō), the outermost island on the flat, is 513 feet (156^m4) high, and lies off the south-western end of Ing

Charts 104, 3480, 1262, 2347.

Chart 1558, plan of Shoan kō.

do; Sonmultong gak (Senbutsudō kaku) and Taep'nuggumi gak (Taifūkyūmi kaku) are, respectively, its north-western and southern points.

- 5 T'ogum do (Ga tō), 415 feet (126^m5) high, lies southward of Sonae do, from which it is separated by a deep channel about 3 cables wide. Chō do (Cho tō), 284 feet (86^m6) high, lies about one mile westward of T'ogum do, with Sōcho do (Shōcho tō), 133 feet (40^m5) high, about 2 cables westward of its north-western end. Kadōk to (Katoku tō),
10 126 feet (38^m4) high, is an islet lying about 1½ miles westward of Sonmultong gak.

Chart 3393.

A rock with a depth of 17 feet (5^m2) over it, lies about 1½ miles south-westward of Kadōk to.

- 15 Oemo kundo (Gaimō guntō), lying north-westward of Kadōk to is described on page 519.

Chart 1558, plan of Shoan kō.

- Tidal streams.**—Northward and southward of Soan kundo the tidal streams set eastward and westward, the west-going stream
20 running from about 4 hours after low water to about 4 hours after high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and the east-going stream from about 4 hours after high water to about 4 hours after low water; at spring tides there is only a very brief period of slack water.

- 25 Southward of Soan do the west-going stream divides into two parts, one part setting northward into Soan hang, and the other passing on both sides of Chaji do, past the southern extremity of Pogil to and then setting north-westward. The east-going stream acts in the reverse way. The maximum rate is 4½ knots.

- 30 *Charts 3365, 913.*

- WESTERN SIDE OF KOREA.**—The western coast of Korea for about 77 miles northward of Haenam gak (*Lat.* 34° 18' N., *Long.* 126° 31' E.), the south-western extremity of the Korean peninsula, is much indented by bays and inlets; these are, however, so obstructed
35 by sand and mud flats that there are few anchorages for large vessels. Numerous islands lie off this coast, either singly or in groups, but there are few good anchorages amongst them.

Chart 3365.

- MARO HAE AND INNER ISLANDS OFF THE SOUTH-WESTERN
40 CORNER OF KOREA.**—**Haenam gak.**—**Islands.**—Haenam gak is situated nearly 4 miles north-north-westward of the northern point of Nohwa do, and has a hill 505 feet (153^m9) high on it; another hill, situated about 6 cables northward of Haenam gak, is 548 feet (167^m0) high. Both these hills are prominent. An islet, 39 feet (11^m9) high,
45 lies about 3 cables westward of Haenam gak and 1½ cables offshore, and about 3 cables north-westward of this islet is an island, 144 feet (43^m9) high; another islet, 229 feet (69^m8) high, lies about one mile further northward.

- For the description of the coast eastward of Haenam gak, *see* South
50 and East coasts of Korea, East coast of Siberia, and Sea of Okhotsk Pilot. The coast northward of Haenam gak is described with Maro hae (Baro kai) on page 520.

Charts 104, 3480, 1262, 2347.

Chart 3393.

Islands and dangers south-westward of Haenam gak.—Chang kundo (Chō guntō) consists of five small islands and a few islets; Oryong do (Gyoryū tō), the north-eastern and largest island of the group, lies about 2 miles westward of Haenam gak and is 284 feet (86^m6) high. A shoal, with a depth of 11 feet (3^m4) over it, lies about 3 cables south-eastward of the southern extremity of Oryong do, and about 3 cables eastward of it is a 20-foot (6^m1) patch. U do (Chō tō), an islet 116 feet (35^m4) high, lies close off the northern point of Oryong do, and there is a clear channel, with depths of about 15 fathoms (27^m4) in the fairway, between this islet and Haenam gak; the tidal streams in this channel are strong.

Sojōngwōn do (Shōseigen tō), 192 feet (58^m5) high, lies at the western end of Chang kundo and nearly 2 miles westward of the southern extremity of Oryong do; a 29-foot (8^m8) patch lies about 3 cables north-westward of Sojōngwōn do, and a 23-foot (7^m0) patch lies nearly 1½ miles northward of this island. Taejōngwōn do (Daiseigen tō), 218 feet (66^m5) high, lies close southward of Sojōngwōn do. Hyongje do (Keitei tō) consists of two rocky islets lying close together, and the western and higher of the two is 97 feet (29^m6) high and lies nearly half a mile south-westward of Taejōngwōn do. Changgu do (Chōkyū tō) and Sochanggu do (Shōchōkyū tō), 244 and 208 feet (74^m4 and 63^m4) high, respectively, are the middle islands of the group; the latter is the northern island of the two and is wooded. A rock, with a depth of 31 feet (9^m4) over it, lies about half a mile southward of Changgu do.

Oemo kundo (Gaimō guntō), lying south-westward of Chang kundo, consists of three small islands and several rocks. Chukkul to (Chikukutsu tō), 205 feet (62^m5) high, the easternmost and largest island of this group, lies about 3½ miles south-westward of Oryong do; Munobuk to (Mongyohoku tō), a rock 133 feet (40^m4) high, lies nearly 4 cables south-eastward of Chukkul to, and about 2 cables further south-eastward is Munonam do (Mongyonan tō), a rock 123 feet (37^m5) high, covered with grass. Am do (San tō), the middle island of the group, rises steeply to an elevation of 290 feet (88^m4) at its south-western end and slopes down gradually north-eastward; it is a good mark when seen from south-eastward, having the appearance of a dog lying down with its head raised. A rock, 4 feet (1^m2) high, lies about one cable off the northern point of Am do (*Lat.* 34° 14' N., *Long.* 126° 25' E.). Demo do (Gaimō tō), the westernmost island of the group, lies nearly one mile westward of Am do and rises steeply on its southern side to an elevation of 284 feet (86^m6), thence sloping down gradually to its northern extremity; Haemun ch'o (Kaimon shō), a rock which dries 8 feet (2^m4), lies about 3 cables westward of Demo do, and a rock above water lies about 3 cables north-eastward of this island. A shoal, with a least depth of 21 feet (6^m4) over it, lies about one mile northward of Demo do.

Light.—Fog signal.—A light is exhibited, at an elevation of 302 feet (92^m0), from a white octagonal concrete tower, 27 feet (8^m2) in height, on the summit of Oryong do. A fog signal is sounded from the lighthouse.

Charts 3393, 3365.

Maro hae and approach.—Islands and dangers.—Beacons.—Tidal streams.—Maro hae (Baro kai) is the name applied to the area be-

Charts 104, 3480, 1262, 2347.

Charts 3393, 3365.

tween the coast northward of Haenam gak, and the eastern coast of the large island of Chin do (tō). At its northern end it is connected with Chongdung hae (Teitō kai) (page 548) by a narrow strait named
 5 Myongyangdo sudo (Meiyōto). Both shores of Maro hae are bordered by mud flats which partly dry, and rows of fishing stakes are placed on them. The northern part of the gulf is narrow and there are several shoals, but a least depth of 5 fathoms (9^m1) can be carried throughout; the tidal streams are strong, and it should not be
 10 entered without local knowledge.

Chart 3393.

Milmae do (Mitsubai tō), 146 feet (44^m5) high, is an islet in the southern part of Maro hae and lies about 2½ miles north-westward of Demo do; a rock, 34 feet (10^m4) high, lies about 2 cables south-
 15 westward of this islet. Kalmyōng do (Katsumei tō), 222 feet (67^m7) high, is an islet situated about 2½ miles north-north-eastward of Milmae do, and a rock, 74 feet (22^m6) high, lies about 2 cables westward of it; a 13-foot (4^m0) patch lies about 3 cables northward of this rock, and a 5-fathom (9^m1) patch lies about one mile north-
 20 westward of the same rock. Man sō (sho), a rock 12 feet (3^m7) high, lies about 1½ miles eastward of Kalmyōng do. A group of two islets lies about 3 miles north-westward of Kalmyōng do. Kuja do (Kushi tō), the southern island, is 271 feet (82^m6) high; a rock, 48 feet (14^m6) high, lies about 2 cables westward of the north-western point
 25 of this islet. Soguja do, (Shōkushi tō), the northern island, is in two parts and 160 feet (48^m8) high; a rock, 153 feet (46^m6) high, lies off its eastern side.

Charts 3393, 3365.

The eastern side of Maro hae, between Haenam gak and a point
 30 situated about 8½ miles northward, is indented by two bays, but the southern of these is very shallow, and the northern is almost entirely occupied by a mud flat which dries. Obul to (Obutsu tō), an island 425 feet (129^m5) high, lies off the northern entrance point of the southern bay, and on the northern side of the strait between them is
 35 the fishing harbour and village of Oran-ni (Oranchin); the village lies at the head of a small cove, which dries; a breakwater extends from the western entrance point, and two breakwaters extend from the eastern entrance point of the cove. There is a stone pier at the village, but it dries alongside at low water. A reef, which dries,
 40 lies nearly in the middle of the eastern entrance to the strait between Obul to and Oran-ni, and is marked by two beacons consisting of white concrete pillars surmounted by triangles. Chuk to (Chiku tō), 205 feet (62^m5) high, lies off the northern entrance point of the northern bay.

45 Chart 3393.

Kumho yōlto (Kinko rettō) is a group of islands and rocks lying on a bank, with depths of less than 3 fathoms (5^m5) over it, which extends about 1½ miles from the south-eastern coast of Chin do; Kumho do (Kinko tō), the northernmost island of the group, is 297
 50 feet (90^m5) high and lies about 6 miles north-westward of Oran-ni. Mo do (Bō tō), 166 feet (50^m6) high, lies close south-westward of Kumho do. A shoal, with a depth of 15 feet (4^m6) over it, and a 22-foot (6^m7) rock, lie, respectively, about 1½ and 3 miles southward of Mo do (Lat. 34° 24' N., Long. 126° 21' E.).

Charts 104, 3480, 1262, 2347.

Chart 3393.

Samma do (Sanba tō) consists of a group of five islands, on which are a few trees, lying on the eastern side of the southern end of the narrow part of Maro hae; Hama do (Kaba tō), the south-eastern island of the group, is 195 feet (59^m4) high, and lies about 5 miles north-north-westward of Oran-ni; a rock, 74 feet (22^m6) high, lies off its southern side. A rock, with a depth of 13 feet (4^m0) over it, lies about 6 cables westward of Hama do, and a rock, with a depth of 4 fathoms (7^m3) over it, lies nearly one mile west-south-westward from the same island. Chungma do (Chuba tō), 123 feet (37^m5) high, lies close north-westward of Hama do, and An do (tō), 126 feet (38^m4) high, is the next island northward. Sangma do (Jōba tō), 182 feet (55^m5) high, is the north-western island of the group. A conical hill, 192 feet (58^m5) high, on the western side of the second island from northward, is a useful mark for vessels proceeding northward through the gulf. Kwandu (Kantō) san, a rocky hill, 575 feet (175^m3) high, situated on the coast east-north-eastward of Sangma do, is a useful landmark when entering Maro hae from northward. The tidal streams run northward and southward near Samma do, with a maximum rate of from 2 to 2½ knots. Wa do (A tō), 34 feet (10^m4) high, lies on the western side of the gulf about 1½ miles north-westward of Sangma do.

Charts 3393, 3365.

About 1½ miles northward of Kwandu san is the southern entrance point of a large bay, which is, however, almost entirely occupied by flats which dry; it is entered by a narrow passage which divides into two channels about 1½ miles within the entrance, one, named Kirip gang, running north-eastward, and the other, named Kūyong gang, eastward to Haech'ang-ni, a village on the southern shore about 4 miles eastward of the southern entrance point of the bay. Tūngūi do (Chōi tō) is the south-western of two islands off the northern entrance point to this bay; a conical hill 215 feet (65^m5) high, with a solitary pine on its summit, situated on the south-eastern extremity of this island, is prominent.

Chart 3393.

Light.—A light is exhibited from a white concrete structure on the head of the western breakwater at Oran-ni.

Myongyangdo sudo.—Myongyangdo sudo (Meiyōto) the northern entrance to Maro hae, is only 1½ cables wide at its narrowest part and the tidal streams are very strong. There are several hills which are useful landmarks for the navigation of Myongyangdo sudo. Manggum (Bōkin) san, situated just within the south-western shore of the narrowest part of the strait, is a conical hill 369 feet (112^m5) high and plainly indicates the position of the strait from a distance. Kumgol (Kinkotsu) san is a sharp rocky peak, 657 feet (200^m2) high, situated about 1½ miles south-south-westward of Manggum san, and is prominent from all sides. Harris point (*Lat.* 34° 33' N., *Long.* 126° 21' E.), situated about 2 miles east-south-eastward of Manggum san, is the eastern entrance point to a deep indentation on the southern side of the strait, which is largely occupied by a drying flat on which Nae do (Nai tō), 244 feet (74^m4) high, is situated. Sōng (Sei) san, situated on the eastern side of the south-eastern entrance to Myongyangdo sudo and about 2½ miles east-south-eastward of Harris point, is 284 feet (86^m6) high; alum is mined on the northern side

Charts 104, 3480, 1262, 2347.

Chart 3393.

of this hill and is brought down by a light railway to some black godowns and a stone pier on its south-western side. Ongmae (Gyokumai) san, lying about $2\frac{1}{2}$ miles north-north-westward of Sōng san, is a prominent, reddish, rounded hill, 572 feet (174^m3) high; alum is also mined on its summit and is brought down to a stone pier on the coast south-westward of the hill. There is a deep indentation on the northern side of the strait immediately westward of Ongmae san; it is occupied by a drying flat on which there are several islets.

Usuyōng (Usuiei) is a small town situated on the northern side of Myongyangdo sudo, northward of Manggum san. Landing can be effected at a stone bund which fronts the town and nearly dries. There is a telegraph office in the town, and there is communication by sea with Mokp'o.

Lights.—A light is exhibited, at an elevation of 38 feet (11^m6), from a red circular iron tower on a concrete base, 42 feet (12^m8) in height, situated on Pang-tan (Hō tan), a rock which dries, lying on the northern side of the fairway and nearly half a mile north-north-eastward of Harris point.

Chin-do light is exhibited, at an elevation of 55 feet (16^m8), from a white circular brick tower, 24 feet (7^m3) in height, situated on a point at the northern end of Chin do and on the south-western side of the narrowest part of Myongyangdo sudo.

Islets and dangers.—Im-om (Ryū gan) is a prominent rock 23 feet (7^m0) high, white from bird's droppings, situated about 4 cables southward of Sōng san and nearly 2 cables offshore. A rock, which dries one foot (0^m3), lies about half a mile west-north-westward of Im-om and nearly $1\frac{1}{2}$ cables offshore. Shoals, with depths of from 26 to 34 feet (7^m9 to 10^m4) over them, lie westward of Sōng san, and near the middle of the strait.

Kambu do (Kanfu tō), 234 feet (71^m3) high, lies about three-quarters of a mile south-eastward of Harris point and 2 cables offshore; a shoal, with a least depth of 11 feet (3^m4) over it, lies between this islet and Harris point. A 28-foot (8^m5) patch lies in the fairway about 4 cables eastward of Harris point. Song do (Shō tō), 54 feet (16^m5) high, lies about three-quarters of a mile eastward of Harris point, and shoal water extends about 2 cables southward from this islet; some islets and reefs lie between this islet and the north-eastern shore of the strait.

A shoal, with a least depth of 25 feet (7^m6) over it, lies near the middle of the fairway about half a mile north-westward of Harris point, and a rock, with a depth of 11 feet (3^m4) over it, lies nearly 7 cables westward of this point.

Nok to (Ka tō), 195 feet (59^m4) high, lies close to the northern shore north-westward of Harris point; Kul to (Kutsu tō), 116 feet (35^m4) high, lies about 2 cables south-westward of Nok to, and another islet, 100 feet (30^m5) high, lies close off the western coast of the latter. The fairway through the strait lies between Nok to and Kul to.

A rock, with a depth of 6 feet (1^m8) over it, lies about half a cable offshore on the northern side of the strait in its narrowest part opposite Manggum san.

Yang do (Yō tō), 83 feet (25^m3) high, lies on the northern side of the strait opposite the town of Usuyōng.

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Chart 3393.

An islet, 28 feet (8^m5) high, lies about a quarter of a mile offshore off the northern extremity of Chin do, in the western entrance to Myongyangdo sudo ; a shoal, with a least depth of 4 fathoms (7^m3) over it, lies about half a mile eastward of this islet. 5

Tidal streams.—The tidal streams in Myongyangdo sudo set north-westward with the rising tide, and south-eastward with the falling tide ; the former runs from about one hour after low water till about one hour after high water at Sangma do, and the latter runs for the remainder of the time. Off Chin-do lighthouse (*Lat.* 34° 34' N., 10 *Long.* 126° 18' E.) the tidal streams attain a rate of 7 knots at neap tides and 9 knots at spring tides, but a short distance within the strait these rates increase to 9 and 11 knots, respectively.

In the south-eastern entrance to Myongyangdo sudo, high and low water occur about 40 minutes later than at Sangma do, and in the 15 north-western entrance about 50 minutes earlier.

Cables.—Beacons.—A submarine telegraph cable crosses the strait near Harris point ; each landing place is marked by two pairs of beacons, and anchorage is prohibited within the alignments of each pair. See page 37. 20

An overhead power cable crosses Myongyangdo sudo, at an elevation of 174 feet (53^m0), in a north-easterly direction from a position near Chin-do lighthouse.

Chin do.—Islands and dangers.—Chin do (tō) is the largest island off the south-western extremity of the Korean peninsula, and is 25 generally hilly. Sangoru (Sensatsu) san, situated 3 miles westward of the eastern point of Chin do, is 1,586 feet (483^m4) high and is the highest peak on that island, but it is difficult to identify except from northward. Yōgwi (Joki) san, situated in the southern part of the island, is a rocky peak, 1,502 feet (457^m8) high, prominent from all 30 sides ; Somang (Seibō) san is a conical, wooded hill, 576 feet (175^m6) high, situated on the south-western extremity of the island, about 4½ miles west-south-westward of Yōgwi san, and is a useful mark for vessels passing through Changjuk sudo (Chōchiku suidō) ; near the coast about 1½ miles eastward of Somang san is a rocky peak, 652 35 feet (198^m7) high, the southern side of which is steep and which appears like a horn when seen from eastward or westward.

Kap to (Kō tō) is a wooded island, 563 feet (171^m6) high, connected to the south-eastern coast of Chin do by a mud bank which dries, and lies about 3½ miles west-south-westward of Kumha yōlto, 40 described on page 520 ; there are numbers of small islands between, the positions of which can best be seen from the chart. A rock, with a depth of 11 feet (3^m4) over it, lies about one mile westward of the southern point of Kap to. Chuk to, 193 feet (58^m8) high, lies about three-quarters of a mile offshore about 3½ miles west-south-westward 45 of Kap to ; Tasoch'i do (Daishotō tō), 81 feet (24^m7) high, lies about 1½ miles westward of Chuk to, and a rock, 48 feet (14^m6) high, lies between but closer inshore.

Chodo hae (Chōtō kai) is a bay on the south-western coast of Chin do, entered close northward of the point on which is Somang san, 50 (*Lat.* 34° 21' N., *Long.* 126° 08' E.) but it is almost entirely occupied by mud flats which dry ; three islets, from 110 to 193 feet (33^m5 to 58^m8) high, lie close off its south-eastern entrance point. The islands and dangers off the north-western side of Chin do are described with

Charts 3365, 104, 3480, 1262, 2347.

Chart 3393.

Chongdung hae (Teitō kai) ; see page 548. About midway along the north-western coast of Chin do and about $6\frac{1}{2}$ miles west-south-westward of Chin-do light (page 522) is the entrance to Sop'o gang (Sōho kō), an inlet which penetrates more than half-way through the island in a southerly direction, although the greater part of it dries ; Chindo (Chin-tō), the principle village in Chin do, is situated $1\frac{1}{2}$ miles eastward of the head of an eastern arm, entered about 2 miles within the entrance of this islet (*Lat. $34^{\circ} 29' N.$, Long. $126^{\circ} 16' E.$*).

10 **ISLANDS AND CHANNELS SOUTH-WESTWARD OF CHIN**

DO.—Changjuk sudo.—Changjuk sudo (Chōchiku suidō), the first of the principal channels between the various groups of islands lying south-westward of Chin do, leads into Chongdung hae (Teitō kai) (page 548), and is the best approach to Mokp'o hang (Mokuho kō) (page 556) from southward ; this channel is bounded north-eastward by the south-western coast of Chin do, and south-westward by Tokkō kundo (Dokukyo guntō), Hajo do (Kachō tō), and Sangjo do (Jōchō tō).

Islands and dangers on the south-western side of Changjuk sudo.—

Anchorage.—Tokkō kundo is a group of islands lying in the south-eastern part of Changjuk sudo ; Tokkō do (Dokukyo tō), the largest of the group, lies about $6\frac{1}{2}$ miles south-south-eastward of Somang san, and has a prominent and somewhat pointed summit 592 feet (180^m4) high. T'anhang do (Dankō tō), 435 feet (132^m6) high, lies close off the southern extremity of Tokkō do and is connected to it by
25 a rocky ridge which dries ; three prominent rocks, 182 feet (55^m5) high, lie close off the eastern point of T'anhang do. Ku do (Karumeki tō) lies close westward of the northern extremity of Tokkō do, and is a thickly wooded island 274 feet (83^m5) high ; Pyon do (Ben tō), a prominent pointed rock 146 feet (44^m5) high, lies about a quarter of a
30 mile north-westward of Ku do. Su do (Shitsu tō), situated about $1\frac{1}{2}$ miles westward of the northern extremity of Tokkō do, has a flat summit, 399 feet (121^m6) high, with some pine trees on it ; So-bia do (Shōhia tō), a thickly wooded islet, 160 feet (48^m8) high, lies close off the southern extremity of Su do and is connected to it by a reef,
35 and about 3 cables south-westward of this islet is Tu sō (Tō sho), a rock 48 feet (14^m6) high. Hyōl to (Ketsu tō), 304 feet (92^m7) high, lies nearly one mile south-westward of T'anhang do and has some houses on its northern side ; a rock, which dries 6 feet (1^m8), lies about $1\frac{1}{2}$ cables south-westward of Hyōl to. Cheju do (Saishū tō),
40 an islet 104 feet (31^m7) high, lies about 4 cables eastward of Hyōl to, and between them is a pointed rock 18 feet (5^m5) high. Ch'o do (Sō tō), an islet, covered with grass and 199 feet (60^m7) high, lies close northward of Hyōl to, and between them is Kaeui sō (Kai sho), a pointed rock 91 feet (27^m7) high. Kanam sō (Karan sho), a rock
45 28 feet (8^m5) high, lies about midway between Hyōl to and T'anhang do, and close north-westward of this rock is a rock which dries 9 feet (2^m7). Naptaegi do (Rōdaiki tō) is a wooded island, 173 feet (52^m7) high, lying about 4 cables westward of Hyōl to ; Hwadan do (Katan tō), a rock 100 feet (30^m5) high, lies about 2 cables south-westward
50 of Naptaegi do. Kyong sō (Kei sho), a rock, 9 feet (2^m7) high, lies about three-quarters of a mile north-westward of Naptaegi do, and nearly one mile eastward of this rock is another rock 15 feet (4^m6) high, named Kasa sō (Kashi sho).

Charts 3365, 104, 3480, 1262, 2347.

Chart 3393.

Hajo do (Kachō tō) lies with its south-eastern extremity about 2½ miles west-north-westward of Su do, and there are several villages on it ; it is the largest island of the group next westward of Tokkō kundo. Tonde (Tondai) san (*Lat. 34° 17' N., Long. 126° 03' E.*), the summit of the island, is situated in the south-western part, and is a fairly prominent sharp peak, 894 feet (272^m5) high ; a ridge runs westward from Tonde san, and terminates in a prominent sharp, rocky crag. Sin'gom (Shinken) san, a rocky peak 757 feet (230^m7) high, situated in about the middle of the northern side of the island, is very prominent from northward. Chukhang do (Chikukō tō) is a rocky island, 524 feet (159^m7) high, lying close off the south-eastern point of Hajo do and connected to it by a shoal ridge ; there is a rock, 84 feet (25^m6) high, off the north-western extremity of Chukhang do. There is a village at the head of the bay on the northern side of Chukhang do, and small vessels with local knowledge can obtain sheltered anchorage here with southerly winds. Tamch'u sō (Tanshū sho), a rock 35 feet (10^m7) high, lies about 3 cables south-eastward of Chukhang do. Two islets lie about three-quarters of a mile north-eastward and eastward, respectively, of the north-eastern point of Chukhang do ; Kum do (Kōkin tō), the southern of the two, is 198 feet (60^m3) high, and Kangdae to (Kōdai tō), the northern, is 110 feet (33^m5) high. Huk sō (Koku sho), a black rock 41 feet (12^m5) high, lies about three-quarters of a mile south-eastward of the north-eastern point of Hajo do, and close eastward of this rock is a rock which dries 10 feet (3^m0).

Sangjo do (Jōchō tō) is separated from the northern side of Hajo do by Chodo sudo (Chōtō suidō), which is too narrow in places to be used except by small vessels with local knowledge. Tondae (Tondai) san, the summit of the island, is a sharp peak, 730 feet (222^m5) high, situated near the western end, and is prominent from westward. There are three islets, from 64 to 120 feet (19^m5 to 36^m6) high, and four indentations on the southern side of the island, but the latter are mostly occupied by mud flats which dry. Tanku do (Tō tan), the eastern extremity of Sangjo do, is a promontory 225 feet (68^m6) high. Two islets, 150 and 71 feet (45^m7 and 21^m6) high, respectively, and a rock, 5 feet (1^m5) high, lie off the north-western side of the western extremity of Sangjo do.

Ok to (Gyoku tō), 346 feet (105^m5) high, is separated from the northern point of Sangjo do by a narrow channel only available for boats, and is divided into two parts by a narrow neck of land ; the eastern side of the island is steep-to. Siya do (Jiya tō), an islet, 97 feet (29^m6) high, covered with pine trees, lies close off the western side of the northern point of Sangjo do, and about 4 cables north-eastward of this point is a black rock, 38 feet (11^m6) high, named Omi do (Gomi tō). A bank, with depths of less than 3 fathoms (5^m5) over it, extends about half a mile westward from Ok to.

The islands off the north-western entrance to Changjuk sudo are described on page 546.

Light.—Fog signal.—Storm signals.—A light is exhibited, at an elevation of 152 feet (46^m3), from a white circular concrete tower, 46 feet (14^m0) in height, situated on the north-eastern point of Hajo do. A fog signal is sounded from the lighthouse.

Storm signals are displayed ; see page. 28.

Charts 3365, 104, 3480, 1262, 2347.

Chart 3393.

Islands and dangers in Changjuk sudo.—Pulmu do (Butsumu tō), the easternmost island in Changjuk sudo, lies about 4 miles eastward of the north-eastern point of Hajo do and has a flat summit, 110 feet
 5 (33^m5) high. Depths are irregular for about 1½ miles south-eastward of Pulmu do, with less than 10 fathoms (18^m3) in places.

Saja do (Shishi tō), 281 feet (85^m6) high, lies about half a mile westward of Pulmu do, and a rock, which dries one foot (0^m3), lies about 3 cables off its southern side; depths of less than 6 fathoms
 10 (11^m0) extend about a quarter of a mile south-eastward from its eastern end. Sodang sō (Shotō sho), a rock 38 feet (11^m6) high, lies close off the north-western point of Saja do, and a rock, with a depth of 33 feet (10^m1) over it, lies about 6 cables westward of the same point.

15 Kilma do (Kitsuba tō) (*Lat. 34° 20' N., Long. 126° 07' E.*), situated about 1½ miles westward of Saja do, is 222 feet (67^m7) high and thickly covered with scrub; a bank, with a least depth of 33 feet (10^m1) over it, lies about 2 cables north-westward of this island. An islet, 48 feet (14^m6) high, lies about 3 cables southward of Kilma do, and about
 20 a quarter of a mile eastward of this islet is Han'gan sō (Kankan sho), an islet, 78 feet (23^m8) high, with a rock, which dries, between.

Changjuk to (Chōchiku tō), 301 feet (91^m7) high, lies with its southern extremity about three-quarters of a mile north-westward of Kilma do, and has steep, rocky coasts. A bank, with a least depth
 25 of about 9 fathoms (16^m5) over it, lies nearly one mile westward of the northern extremity of Changjuk to and similar banks lie about one mile northward and 1½ miles north-north-westward of this island.

Tidal streams.—The tidal streams in Changjuk sudo run north-westward from about 1h. 20m. after low water at Hajo do till about
 30 1h. 20m. after high water, and south-eastward for the remainder of the time; the maximum rate is 7 knots.

In the channel westward of Tokkō kundo the tidal streams set north-north-westward with the rising tide and south-south-eastward with the falling tide, the directions changing about one hour after
 35 high and low water at Hajo do; the maximum rate is 2½ knots.

In Chodo sudo the west-going stream runs from about one hour after low water at Hajo do until about 5 hours after the same low water; the east-going stream runs from about 5 hours after low water at Hajo do till about one hour after the next low water. The
 40 maximum rate is 2 knots.

Local magnetic anomaly.—In 1935, a local magnetic anomaly was reported about 4 miles southward of Tokkō kundo.

Islands and dangers southward of Hajo do.—Kwanmae do (Kanbai tō) lies with its northern extremity about one mile southward of
 45 Hajo do (page 525), and its summit is a sharp peak, 727 feet (221^m6) high, prominent from all directions; near the southern extremity of the island is a saddle-shaped hill, like the back of a camel, 556 feet (169^m5) high, and half way between this hill and the southern point of the islands is a cleft or scar, which has the appearance of a waterfall
 50 when seen from westward. The cliffs at the western extremity of the island are conspicuous.

Kyo sō (Kyō sho), an islet 55 feet (16^m8) high, lies close off the southern point of Kwanmae do. Hyongje do (Keitei tō) consists of two islets lying close together and connected to each other by a

Chart 3393.

shoal ridge ; the northern lies about 2 cables southward of the south-eastern point of Kwanmae do and is 100 feet (30^m5) high, and the southern is 127 feet (38^m7) high. A bank, with a depth of less than 10 fathoms (18^m3) over it, lies about half a mile south-south-westward of Hyongje do. 6

Koktu do (Kyokuto tō), an islet 130 feet (39^m6) high, lies nearly 1½ miles eastward of the south-eastern point of Kwanmae do. Namwol ch'o (Nanetsu shō) is a pinnacle rock, with a depth of 7 feet (2^m1) over it, lying about half a mile southward of Koktu do, and about 1½ cables westward of this rock is a rock with a depth of 16 feet (4^m9) over it ; the summit of Tonggōch'a do (Tokyoji tō), an island situated about 3½ miles westward of Kwanmae do, in line with the southern islet of Hyongje do, bearing about 279°, leads about 3 cables southward of Namwol ch'o. A shoal, with a least depth of 15 25 feet (7^m6) over it, lies about 4 cables northward of Koktu do, and a bank, with a least depth of 28 feet (8^m5) over it, lies about three-quarters of a mile north-eastward of the same islet.

Sinūi do (Shini tō) (*Lat.* 34° 14' N., *Long.* 126° 05' E.), 261 feet (79^m5) high, lies nearly half a mile north-westward of Koktu do, and about 3 cables further north-westward is Hang do (Kō tō), an islet 255 feet (77^m7) high, connected to the eastern point of Kwanmae do by a reef. Chōngdūng do (Seitō tō) lies about 4 cables north-north-eastward of Sinūi do, and rises to an elevation of 448 feet (136^m5) on its eastern side ; a reef extends about a quarter of a mile from the 25 western side of Chōngdūng do, and on this reef is an islet 81 feet (24^m7) high. Mok sō (Moku sho), a rock 35 feet (10^m7) high, with a drying rock close off its north-western side, lies nearly half a mile eastward of Chōngdūng do.

Pangōm do (Hogan tō), an islet 166 feet (50^m6) high, with a prominent rock on its summit, lies close off the north-eastern point of Kwanmae do and is connected to it by a reef ; a reef, with a depth of 13 feet (4^m0) over it, lies about 3 cables eastward of Pangōm do. Kakhūl to (Kakukitsu tō), 389 feet (118^m6) high, lies close off the northern point of Kwanmae do and is connected to it by a reef. Suok to 35 (Suigyoku tō), 235 feet (71^m6) high, lies about 6 cables northward of Kakhūl to and close off the western entrance point of a bay in the middle of the southern coast of Hajo do ; a 26 foot (7^m9) patch lies about a quarter of a mile westward of this islet.

A bank, with depths of less than 3 fathoms (5^m5) over it, extends 40 about one mile offshore off the north-western side of Kwanmae do.

Chukhang sudo.—**Tidal streams.**—Chukhang sudo (Chikukō suidō) is the channel bounded northward by Chukhang do (page 525) and the eastern part of the southern coast of Hajo do, and southward by Ch'ōngdūng do and Kwanmae do ; as it is deep and practically free 45 from dangers, it affords a good approach to Chodo p'o (Chōtō ho) from eastward.

The tidal streams in Chukhang sudo run north-westward from about one hour after low water till about one hour after high water at Hajo do, and south-eastward for the remainder of the time ; the maximum 50 rate is 5 knots.

Islands and dangers westward of Kwanmae do.—**Tidal streams.**—Koma do (Kyoba tō), 196 feet (59^m7) high, lies about 1½ miles westward of the western extremity of Kwanmae do, and is covered

Charts 3365, 104, 3480, 1262, 2347.

Chart 3393.

with scrub. Sogama do (Shōkyoba tō), a rock 51 feet (15^m5) high, lies about half a mile north-north-eastward of Koma do, and about one cable northward of this rock is a rock which dries 6 feet (1^m8).

- 5 Taema do (Daiba tō) is an island lying with its south-eastern point nearly one mile north-north-eastward of Sogama do ; its summit is a sharp peak, 589 feet (179^m5) high, rising steeply from the western coast. An islet lies close off the south-eastern point of Taema do, and two islets, the outer 153 feet (46^m6) high, lie close off the north-eastern point.

10 Sango sō (Jōgyo sho), a rock 71 feet (21^m6) high, lies about three-quarters of a mile eastward of the south-eastern point of Taema do ; shoal water extends for about one cable around this rock, and a 17-foot (5^m2) patch lies about 6 cables southward of it.

- 15 Haesu sō (Kaisui sho) is a group of rocks, the highest of which, 25 feet (7^m6) high, lies about three-quarters of a mile north-north-eastward of Sango sō ; there is foul ground around these rocks, and they should be given a berth of fully 2 cables. Northward of Haesu sō the tidal streams set westward with the rising tide, and eastward 20 with the falling tide, turning about one hour after high and low water at Hajo do, and attaining a rate of 4½ knots.

- Chodo p'o.—Islands and dangers.—Anchorage.**—Chodo p'o (Chōtō ho) is the sound enclosed between Hajo do and Sangjo do on the north-eastern side, and Kwanmae do, Taema do and the islands northward 25 of the latter, on the south-western side ; there are several places within it where vessels with local knowledge can obtain anchorage.

Mo do (Bō tō) lies about half a mile northward of the northern point of Taema do, and has two summits, the western 242 feet (73^m8) high ; foul ground extends about 3 cables from its western extremity.

- 30 Somo do (Shōbō tō), an islet 123 feet (37^m5) high, lies about 2 cables eastward of Mo do ; Huk sō (Koku sho), a black rock 17 feet (5^m2) high, lies about a quarter of a mile south-eastward of Somo do.

- Soma do (Shōba tō), 402 feet (122^m5) high, lies about half a mile north-westward of Mo do ; foul ground, with depths of less than 3 35 fathoms (5^m5) over it, extends nearly 2 cables from its south-eastern side. A shoal, with a depth of 41 feet (12^m5) over it, lies about half a mile southward of Soma do. A double islet 41 feet (12^m5) high, lies on a reef which extends about 2 cables from the western side of Soma do.

- 40 Cho do (Chō tō) (*Lat. 34° 18' N., Long. 126° 00' E.*), situated about 6 cables east-north-eastward of the north-eastern point of Soma do, is a wooded islet with a rounded summit, 64 feet (19^m5) high. Kye do (Kei tō), lying nearly half a mile north-westward of Cho do, is an islet 68 feet (20^m7) high.

- 45 Nabae do (Rahai tō), 271 feet (82^m6) high, lies close off the north-western point of Hajo do. Sonabae do (Shōrahai tō), an islet 58 feet (17^m7) high, covered with pine trees, lies about a quarter of a mile southward of Nabae do ; a small islet 61 feet (18^m6) high, lies about 1½ cables south-eastward of the south-eastern point of Nabae 50 do, and on the outer edge of the mud flat which extends from Hajo do. A 3-fathom (5^m5) patch lies off the north-western extremity of Nabae do.

Kwansa do (Kansa tō) lies about a quarter of a mile northward of Soma do, and has a sharp peak 570 feet (173^m7) high ; the passage

Charts 3365, 104, 3480, 1262, 2347.

Chart 3393.

between these two islands is not even practicable for boats. Chu do (Shū tō) lies close northward of Kwansa do, and is connected to it by a shoal ridge; it has a rounded summit 465 feet (141^m7) high and is uninhabited. Sanja sō (Sanshi sho), a rock 58 feet (17^m7) high, lies about a quarter of a mile north-eastward of the north-eastern point of Chu do. A shoal, with a depth of 46 feet (14^m0) over it, lies in mid-channel about half a mile south-south-eastward of Sanja sō.

Chok to (Soku tō), situated about three-quarters of a mile northward of Chu do, has a rounded summit 291 feet (88^m7) high; foul ground, on which is a rock 31 feet (9^m4) high, extends about 2 cables from its eastern end. Yugūm do (Ryūkin tō), 304 feet (92^m7) high, lies about half a mile north-eastward of Chok to; a rock, 27 feet (8^m2) high, lies close off its north-eastern point. Both these islands are uninhabited.

The islands and dangers westward and northward of Chok to are described on page 546.

Islands and dangers westward of Kwansa do and Soma do.—

Chinmok to (Shimmoku tō), situated close westward of Kwansa do, is a thickly wooded island 350 feet (106^m7) high; Puk to (Hoku tō), an islet 54 feet (16^m5) high, lies about a quarter of a mile southward of Chinmok to. Chinmok ch'o (Shimmoku shō), a steep-to reef with a depth of 9 feet (2^m7) over it, lies about 6 cables southward of Puk to. Kalmok to (Kaboku tō), situated about a quarter of a mile westward of Chinmok to, has a thickly wooded summit 425 feet (129^m5) high; Kal to (Katsu tō), a reddish islet, 133 feet (40^m5) high, lies close off the southern point of Kalmok to, and is connected to it by a reef. A rock, with a depth of 27 feet (8^m2) over it, lies about 2 cables southward of Kal to; a reef, with a depth of one foot (0^m3) over it, lies in the middle of the southern entrance to the channel between Kalmok to and Chinmok to. Singna sō (Shokura tō), a prominent rock 156 feet (47^m5) high, lies about 3 cables northward of Kalmok to, and close eastward of this rock is a rock 8 feet (2^m4) high.

Kōch'a sudo.—Kōch'a kundo.—Tidal streams.—Anchorage.—

Kōch'a sudo (Kyoji suidō) is a deep channel lying between Taema do (page 528) and the islands northward of it which have just been described with Chodo p'o, and Kōch'a kundo. In the south-eastern entrance are Koma do and Sogama do.

Kōch'a kundo (Kyoji guntō) consists of two islands with several islets and rocks between them. Tonggōch'a do (Tokyoji tō), the south-eastern of the two islands, is 451 feet (137^m5) high and lies with its eastern extremity nearly 2 miles south-westward of Taema do; there are several bays, available for small vessels with local knowledge, and villages along its coasts. Puk to (Hoku tō), 182 feet (55^m5) high, lies about 3 cables eastward of the eastern point of Tonggōch'a do; a rock, 44 feet (13^m4) high, lies close eastward, and a reef, which dries 11 feet (3^m4), about one cable southward of this island (*Lat.* 34° 14' N., *Long.* 125° 58' E.).

Charts 3393, 3365.

Sōgōch'a do (Seikyoji tō), the north-western island, has a sharp summit, 526 feet (160^m3) high, on its western side; there are several shoal bays, with villages at their heads, on the southern side of this island. Kong do, 271 feet (82^m6) high, lies off the middle of the southern side of Sōgōch'a do; details of the other islets and rocks between the two main islands can best be seen from the chart.

Charts 104, 3480, 1262, 2347.

Chart 3365.

A bank, with a depth of less than 10 fathoms (18^m3), lies about one mile north-westward of the western end of Sōgōch'a do.

Yanggan sō (Yangan tō), 156 feet (47^m5) high, situated nearly 3 miles north-north-westward of the northern point of Sōgōch'a do, is a very prominent islet. Soyanggan sō (Soyangan tō) is a group of rocks, the highest of which, in about the middle of the group, is 36 feet (11^m0) high, and lies nearly three-quarters of a mile west-north-westward of Yanggan sō.

10 The tidal streams in Kōch'a sudo run north-westward from about 1 h. 40 m. after low water till about 1 h. 40 m. after high water at Hajo do, and south-eastward for the remainder of the time; the maximum rate of the former is 7 knots, and that of the latter 5 knots.

Maenggol sudo.—**Maenggol kundo.**—**Tidal streams.**—Maenggol sudo is a deep channel between Kōch'a kundo and Maenggol kundo (Mōkotsu guntō), situated about 2½ miles south-westward, and is used regularly by vessels.

Chart 3393.

Pyōngp'ung do (Byōbu tō) lies off the southern entrance to 20 Maenggol sudo, with its northern extremity about 4 miles southward of Tonggōch'a do; this island consists of two parts connected by a narrow neck of land, and is very prominent, with precipitous coasts. The summit of the island, situated in the northern part, is 445 feet (135^m6) high, and the highest peak in the southern part is 419 feet 25 (127^m7) high. See view facing page 532.

Chart 3365.

Maenggol kundo (Mōkotsu guntō), is the outermost group of the islands lying south-westward of Chin do, and consists of three main islands, which appear as one when seen from south-eastward.

30 Ku do (Kaku tō), 236 feet (71^m9) high, the southernmost island of the group, lies nearly 4½ miles north-westward of Pyōngp'ung do (*Lat.* 34° 09' N., *Long.* 125° 57' E.); a rock, with a depth of 4½ fathoms (8^m2) over it, lies about 3 cables north-eastward of Ku do, and a rock, with a depth of 4½ fathoms (8^m2) over it, lies about the same distance 35 west-north-westward of this island. Maenggol do (Myangoru tō), 445 feet (135^m6) high, is the middle and largest island of the group, and Chuk to (Chiku tō), 285 feet (86^m9) high, the northernmost island, is connected to it by a shoal ridge. All three islands are inhabited and are covered with grass. Myong do, about 150 feet (45^m7) high, lies 40 off the north-eastern side of Maenggol do, to which it is connected by a shoal ridge. Rocks, including one 42 feet (12^m8) high, extend about 2 cables westward from the south-western point of Chuk to.

Mōngdok to (Bintoku tō) is a prominent islet, 170 feet (51^m8) high, lying about three-quarters of a mile eastward of the southern extremity 45 of Maenggol do. A patch, with a depth of about 9 fathoms (16^m5) over it, lies about a quarter of a mile south-eastward of Mōngdok to.

The tidal streams in Maenggol sudo run north-westward from 2 hours after low water till about 2 hours after high water at Hajo do, and south-eastward from 2 hours after high water till about 2 hours 50 after low water at that island; the maximum rate is 6½ knots.

Light.—**Fog signal.**—**Radiobeacon.**—**Radio D.F. station.**—**Storm signals.**—A light is exhibited, at an elevation of 276 feet (84^m1), from a white circular concrete tower, 30 feet (9^m1) in height, situated on the summit of Chuk to.

Charts 104, 3480, 1262, 2347.

Chart 3365.

A fog signal is sounded from the lighthouse.

There is a radiobeacon, and a radio D.F. station, at the lighthouse.

Storm signals are displayed ; see page 28.

Islet and danger westward of Maenggol kundo.—Pyon sŏ (Salamis rock) lies about $1\frac{1}{2}$ miles westward of Ku do and is a dangerous rock which dries 3 feet (0^m9) ; there is a depth of $3\frac{1}{2}$ fathoms (6^m4) about 2 cables southward of this rock. Kan sŏ (West Pinnacle), situated nearly $1\frac{1}{2}$ miles north-westward of Pyon sŏ, is a very prominent pointed rock, 153 feet (46^m6) high ; there is a patch, with a depth of less than 10 fathoms (18^m3) over it, about 3 cables south-south-eastward of this rock.

HŪKSAN CHEDO.—General remarks.—Tidal streams.—Caution.—

Hŭksan chedo comprises five groups of islands lying westward of the numerous islands off the south-western extremity of Korea, and between the meridians of 125° E. and 125° 30' E.; Sohŭksan do (Shōkokuzan tō), the southernmost of these islands, lies about 37 miles west-south-westward of Chuk to. Taehŭksan kundo (Mackau group) is the northernmost group of Hŭksan chedo, and Taehuksan do (Mackau island), the largest of this group, lies about 35 miles north-north-eastward of Sohŭksan do.

These islands are rocky and infertile, some of them producing nothing but coarse grasses, but many of them are inhabited. The coasts of the various islands are more or less indented by bays, which afford anchorage for small vessels with local knowledge.

In general, the tidal streams set between north and north-north-west with the rising tide, and in the opposite direction with the falling tide. The maximum rate of the tidal streams in the channel westward of Maenggol kundo has been estimated at about $2\frac{1}{2}$ knots, but this rate increases in the narrow channels between the various islands of each group and also off the promontories. Caution is, therefore, necessary, when approaching these islands in foggy weather.

Sojunggwan kundo.—Dangers.—Anchorage.—Sojunggwan kundo (Maury islands) is the south-eastern group of Hōksan chedo, and consists of a number of rocks and reefs scattered around Manjae do, the largest island of this group, which lies about 18 miles westward of Chuk to. See views facing page 532.

Manjae do (*Lat. 34° 13' N., Long. 125° 28' E.*) is divided into two parts by a low, narrow neck of shingle, over which the sea is said to break in rough weather. The summit of the island, is situated at the northern end and is a sharp peak, 606 feet (184^m7) high, with some groups of trees on its southern side, whilst the northern side is precipitous. The coast is precipitous in many places, but landing can be effected on the northern side. There is a small village on the western side of the island, and two bare, rocky islets, 215 and 136 feet (65^m5 and 41^m4) high, respectively, lie close off this coast ; a group of rocks lies close off the eastern point of the island. Small craft with local knowledge can obtain anchorage, in a depth of about 5 fathoms (9^m1), in the middle of the bay on the northern side of the narrow neck of shingle ; this anchorage affords shelter with south-westerly winds, but caution must be exercised when approaching, as the tidal streams are strong, and two reefs, which dry 10 feet (3^m0) lie off the entrance to this bay.

Charts 104, 3480, 1262, 2347.

Chart 3365.

Kuk to, a precipitous islet 325 feet (99^m1) high, with a few stunted trees on it, lies about 3 cables eastward of the eastern extremity of Manjae do ; two rocks lie off the southern point of this islet, and the
5 outer one is 60 feet (18^m3) high and prominent.

Three bare dark brown precipitous rocks lie north-eastward of Manjae do ; the southernmost and highest rock, is 102 feet (31^m1) high and lies about three-quarters of a mile northward of Kuk to ; the middle rock, is 98 feet (29^m9) high ; Kan sō, the northernmost of
10 the three, lies about 1½ miles northward of Kuk to, and is 50 feet (15^m2) high, with rocks above water lie within 2 cables off its eastern side.

Paek sō is a bare rock, 74 feet (22^m6) high, lying nearly one mile west-south-westward of Kan sō.

Sohüksan do.—Islets and dangers.—Anchorage.—Tidal streams.—

15 Sohüksan do (Shōkokuzan tō) lies with its south-eastern extremity about 18 miles south-westward of Manjae do ; its coasts are precipitous, and the higher parts of the island are densely wooded, especially on the northern side. The summit of the island, is a rounded peak, 1,905 feet (580^m6) high. See views facing this page.

20 Mulsōng mal, the south-eastern extremity of the island, consists of high cliffs rising to a sharp, prominent peak 1,065 feet (324^m6) high ; a reef, with a depth of less than 5 fathoms (9^m1) over it, extends a short distance south-eastward from this point. The south-western extremity of Sohüksan do is a rocky promontory with a prominent
25 rock, 97 feet (29^m6) high, lying close off it. Immediately eastward of this promontory is a bight with depths of about 20 fathoms (36^m6), mud, with a shingle beach at the head ; a group of rocks lies close off the eastern entrance point of this bight. There is a village lying at the foot of a hill close to this point.

30 Naptang mal is the cliffy extremity of a peninsula extending from the western coast of Sohüksan do about 2 miles north-westward of its south-western extremity ; two rocks, the inner one being 156 feet (47^m5) high, lie close off this point. Kan sō consists of two rocks lying close together nearly one mile south-eastward of Naptang mal ; the
35 north-eastern of the two is a pillar rock 97 feet (29^m6) high, and the south-western is 10 feet (3^m0) high. A rock 4 feet (1^m2) high, lies about 4 cables south-westward of the latter rock. The bay on the northern side of the above peninsula is sheltered from south-easterly winds and the tidal streams are not strong ; the depths are less than 11 fathoms
40 (20^m1). There is a village on the top of the cliff at the head of this bay.

The northern extremity of the island (*Lat.* 34° 06' N., *Long.* 125° 06' E.), is low and covered with grass ; several islets and rocks lie within a distance of about 4 cables north-westward of this point, the highest, named Hük sō, being 117 feet (35^m7) high. Tuök sō
45 consists of two rocks lying close together about half a mile north-north-eastward of Hük sō ; the southern and higher of the two is 85 feet (25^m9) high. Kaerin sō, an islet with a double summit 230 feet (70^m1) high, lies about three-quarters of a mile north-north-westward of Tuök sō ; a white rock, 64 feet (19^m5) high, lies about one
50 cable southward of this islet. Taegukhül to, an islet 440 feet (134^m1) high, lies about 4 cables westward of Kaerin sō, and a rock 7 feet (2^m1) high, lies close off its northern side ; another islet lies close westward of Taegukhül to and is 156 feet (47^m5) high.

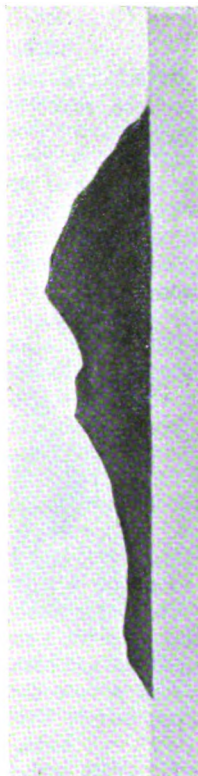
There is a high, rocky bluff on the eastern coast and about 1½

Charts 104, 3480, 1262, 2347.



078°, 6.2 miles.

Pyōngp'ung do (Byōbutō).
419 ft. peak, bearing 087°, 6.5 miles.

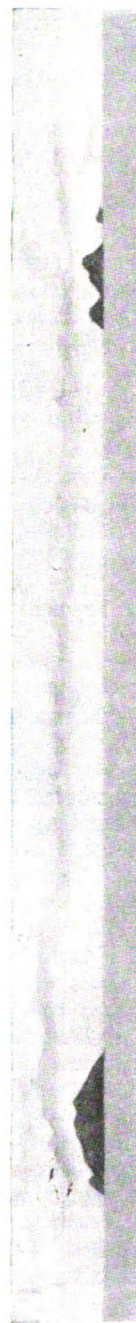


Sohūksan do (Shōkokuzan tō).
Summit bearing 174°, 20.5 miles.



Sam'ae do
(Hydrographer group).
Sojunggan kundo (Maury islands) from south-south-eastward.
Manjae do, bearing 334°, 20 miles.

Kak tō.



Sohūksan do, bearing 288°, 32 miles.
Sojunggan kundo and Sohūksan do.
Sojunggan kundo, bearing 322°. (Originals dated 1934).



Kubhul to.

San'ae do.

Chung'ae do,
summit bearing 688°, 10.7 miles.

Ha'ae do.

Kan sô (Reille rock),
bearing 124°, 10.3 miles.

Samt'ae do (Hydrographer group) from westward.



Yongsan do
(East island).

Tachûksan do
(Mackau island).

Taejang do
(West island).

Maega do (Kô tô),
bearing 206°,
27 miles.

Taehûksan kundo (Mackau group) from northward.



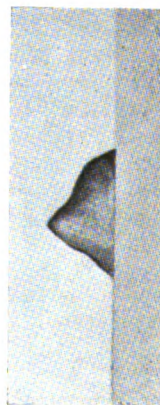
Yongsan do.

Tachûksan do.

Sina do (North Island),
summit bearing 238°, 14 miles.

Maega do.

Taehûksan kundo from north-eastward.



Kyomack to (Single islet),
bearing 119°, 4 miles.



Ch'ûlbal to
(Shichibutsu tô)
bearing 128°, 11.5 miles.

(Originals dated 1934).

Chart 3365.

miles south-eastward of the northern extremity. A small bay on the northern side of this bluff affords some shelter to vessels with local knowledge during light south-westerly winds; a village is situated at the head of this bay, but landing is difficult here owing to rocks. 5

There is no good anchorage around Sohüksan do, but a Japanese destroyer has anchored, in a depth of 34 fathoms (62^m2), mud, with the lighthouse (*see* below) bearing 080°, distant about 6 cables; landing can be effected on the coast south-westward of the lighthouse.

The tidal streams set north-north-westward and south-south-eastward along the eastern and western sides of the island, with a maximum rate of about 2 knots. 10

Light.—Fog signal.—Radiobeacon.—Radio D.F. station.—Storm signals.—A light is exhibited, at an elevation of 272 feet (82^m9), from a white circular brick tower, 36 feet (11^m0) in height, situated 15 on the northern extremity of Sohüksan do. A fog signal is sounded from the lighthouse. There is a radiobeacon, and a radio D.F. station, at the lighthouse. Storm signals are displayed; *see* page 28.

Chart 3480.

Outlying reefs.—Hyūga reef also known as Jitsuko reef, a pinnacle 20 rock with a depth of 3½ fathoms (6^m9) over it, lies about 27 miles west-south-westward of Sohüksan do; there are depths of over 10 fathoms (18^m3) at a distance of half a cable all round the rock, and in general the depths in this locality are from 40 to 50 fathoms (73^m2 to 91^m4) over a fairly level mud bottom, but about one mile north- 25 westward of the rock there is a depth of 14 fathoms (25^m6), rock. *Chart 3365.*

Trawlers have reported losing their nets on a submerged rock situated about 10 miles northward of Sohüksan do.

A bank, with a depth of 18 fathoms (32^m9) over it, and which has 30 not been examined, was reported, in 1946, about 13 miles east-south-eastward of Sohüksan do; it is considered that there may be less depth in the vicinity.

Samt'ae do.—Dangers.—Anchorage.—Tidal streams.—Samt'ae do (Hydrographer group) is a group of three islands and several islets, 35 and rocks, the southernmost of which, named Hat'ae do, lies about 20 miles north-north-eastward of Sohüksan do. These islands are very infertile and the inhabitants depend chiefly on fishing for their subsistence. *See* view facing this page.

With the rising tide; i.e. from about 3 hours before to 3 hours 40 after the time of high water at Yangtze approaches (Admiralty Tide Tables Standard Port); the tidal stream sets northward along the eastern and western sides of the group, and in the opposite direction with the falling tide. Between the islands the tidal stream during the rising tide usually sets eastward in the southern parts of the 45 group and north-westward in the northern part; the reverse occurs with the falling tide.

The summit of Hat'ae do is situated in the south-western part of the island and is 492 feet (150^m0) high. The southern and western coasts of Hat'ae do are cliffy. Kalmi mal, the south-western 50 extremity of the island, is formed by a spur from the summit, and terminates in a high cliff; a rock, which dries 6 feet (1^m8), lies close off this point. There is a small bay on the eastern side of Kalmi mal, but heavy seas run into it with southerly winds. Mul-

Chart 3365.

sŏngni mal, the north-western point of the island, is the cliffy extremity of a narrow tongue of land. A point (*Lat.* $34^{\circ} 24' N.$, *Long.* $125^{\circ} 18' E.$) situated nearly one mile south-eastward of
 5 Mulsŏngni mal, is the extremity of a tongue of land extending northward from the northern coast of Hat'ae do. Between these two points is a bay, with depths of from 5 to 13 fathoms (9^m1 to 23^m8), which affords shelter to small vessels with local knowledge from all except northerly winds; there are two white sandy beaches at the
 10 head of this bay, and a village lies between the hills. Mang sŏ (Patch rock) is a bare rock 74 feet (22^m6) high, with deep water around, lying about three-quarters of a mile eastward of Mulsŏngni mal; it is very prominent, and strata of white quartz on its southern side make it appear like a boat under sail, when seen from eastward; a rock above
 15 water, lies close off its eastern side. A rock, 15 feet (4^m6) high, lies about half a mile south-westward of Mang sŏ and $1\frac{1}{2}$ cables offshore. A rock 153 feet (46^m6) high, lies close off the eastern point of Hat'ae do.

Kan sŏ (Reille rock), situated about $4\frac{1}{2}$ miles south-south-westward of Hat'ae do, consists of three steep-to pinnacle rocks, the eastern
 20 and highest of which is 180 feet (54^m9) high; the western rock is 97 feet (29^m6) high, and the middle one is much lower.

Kwang sŏ (Havergal rock) is a flat rock, which dries one foot (0^m3), lying about $1\frac{1}{2}$ miles west-south-westward of Mulsŏngni mal; when the tidal streams are strong, or with a sea running, there are heavy and
 25 confused tide-rips over this rock, but at times no ripples are to be seen at all. Pyŏn sŏ (Venancourt rock) (page 535), in line with the north-western extremity of Kukhŭl to, the northernmost islet of Samt'ae do, bearing about 035° , leads nearly one mile north-westward of Kwang sŏ, and Mang sŏ in line with Mulsŏngni mal, bearing
 30 about 088° , leads nearly the same distance northward of this rock.

Chungt'ae do lies nearly one mile northward of Mulsŏngni mal, and rises to an elevation of 438 feet (133^m5) in about the centre. Except for a sandy beach on the north-eastern side, where there is a village, the coasts consist of cliffs.

35 Sangt'ae do, a grassy island 527 feet (160^m6) high, is separated from the northern extremity of Chungt'ae do by a channel about a quarter of a mile wide, in which, however, is a reef with a depth of less than 3 fathoms (5^m5) over it. There is a pebble beach, with a village on the top of the cliff behind, on the southern side of Sangt'ae do; otherwise
 40 the coasts are cliffy, and are fringed by reefs in many places.

Taesugae do consists of two rocks, connected to each other by a pebble beach, lying about 4 cables north-eastward of the northern extremity of Sangt'ae do and connected to it by a rocky ridge with a depth of about $2\frac{1}{2}$ fathoms (5^m0) over it; the north-western rock is
 45 166 feet (50^m6) high and there are a few stunted trees on it.

Oe do, 323 feet (98^m4) high, lies about a quarter of a mile northward of Taesugae do and is connected to it by a ridge of rocks; this islet has precipitous sides and there is a group of low trees on its summit.

Kukhŭl to (*Lat.* $34^{\circ} 28' N.$, *Long.* $125^{\circ} 18' E.$), 350 feet (106^m7)
 50 high, lies close off the north-eastern point of Oe do and is similar to it; several rocks lie close off its north-western extremity.

North-west rocks consist of three rocks which dry; the southern of these lies nearly three-quarters of a mile north-westward of the northern extremity of Kukhŭl to and dries 6 feet (1^m8).

Charts 104, 3480, 1262, 2347.

Chart 3365.

Pyŏn sŏ (Venancourt rock), situated nearly 4 miles north-eastward of Kŭkhŭl to, is an islet 127 feet (38^m7) high, and its summit appears pointed when seen from eastward or westward, but rounded from northward or southward. Near Pyŏn sŏ the tidal streams run northward with the rising tide, with a maximum rate of about 1½ knots, and east-south-eastward with the falling tide, with a maximum rate of 2½ knots.

Charts 913, 3365.

Taehŭksan kundo.—**General remarks.**—Taehŭksan kundo (Mackau group), the most northerly group of Hŭksan chedo, consists of a main island Taehŭksan do (Mackau island), which lies with its southern extremity about 7 miles north-north-eastward of Pyŏn sŏ, and several other islands off its eastern, western, and northern sides, as well as some islets and rocks. *See* views facing page 533

Taehŭksan do.—**Islands and dangers.**—**Anchorage.**—**Tidal streams.**—The northern half of Taehŭksan do is hilly and thickly wooded, but in the southern half the slopes are more gradual and there is some arable land. The summit of the island lies in about the middle of the western side, and is 1,328 feet (404^m8) high, thickly wooded, and dark in appearance.

The southern extremity of Taehŭksan do, is cliffy. Several rocks above water lie close off the coast here, and one of them, 48 feet (14^m6) high, is prominent from eastward or westward.

There are several bays on the eastern coast of Taehŭksan do. Several islets lie at the head of the southern bay, and within these is a small inner bay with depths of from 2 to 4 fathoms (3^m9 to 7^m3); a village lies at the head of this inner bay. There are depths of about 7 fathoms (12^m8) in the middle of the next bay northward, and shelter can be obtained from all but south-easterly winds; a village is situated behind trees at the head of the bay.

A comparatively low and flat peninsula forms the north-eastern extremity of Taehŭksan do, and is indented by several small bays which afford shelter to small vessels with local knowledge.

On the southern side of this peninsula is the entrance to a bay divided into smaller bays by a low tongue of land; the south-western of these two bays is foul. A rock awash, which only breaks in rough weather, lies nearly a quarter of a mile offshore in the middle of the bay.

Ka do (Wooded island) is a dark, wooded island lying about 3 cables off the north-eastern extremity of Taehŭksan do, and is 343 feet (104^m5) high. The eastern coast is cliffy and fairly steep-to; the western coast is fringed with rocks, and two rocks, which dry, lie about one cable westward of the northern point of the island.

Kado sudo, the passage between Ka do (*Lat.* 34° 42' N., *Long.* 125° 28' E.) and Taehŭksan do, is barely a quarter of a mile wide between the rocks extending from either side, but there is a least depth of 10 fathoms (18^m3) in the fairway. The tidal streams are strong, and caution must be exercised when using it; overfalls occur in the narrowest parts of the passage. The tidal streams set north-westward and south-eastward; the maximum rate has been estimated at between 3 and 4 knots, but may be more at times.

Chinni hang (St. John harbour) is a bay on the northern coast of Taehŭksan do and is the only good anchorage throughout Hŭksan chedo, but it is only suitable for small vessels with local knowledge;

Charts 104, 3480, 1262, 2347.

Charts 913, 3365.

it is sheltered from all except north-easterly winds and is free from danger except for two rocks which dry, lying close off the southern shore. Thick fog, not rapidly dispersed by the wind, has been
 5 experienced in May. Eagle islets are two grassy islets lying off the western entrance point of the bay and stretching half-way across its entrance; there are numerous rocks between these two islets and between the western islet and the coast, and they thus shelter Chinni hang from north-westward. The northern sides of both
 10 islets are precipitous; the eastern islet is 187 feet (57^m0) high, and the western 205 feet (62^m5). A rock, which dries 11 feet (3^m4), lies about half a cable off the eastern point of the eastern islet. Numerous rocks lie off the northern sides of Eagle islets; the two outermost, 67 feet (20^m4) and 47 feet (14^m3) high, respectively, lie
 15 nearly 2 cables northward of the eastern extremity of the eastern islet. There is a grassy islet, 34 feet (10^m4) high, lying nearly a quarter of a mile south-south-eastward of the western entrance point of Chinni hang and about one cable off the western shore of the bay, with a rock, which dries 9 feet (2^m7), between. A village, situated on
 20 the south-western shore of Chinni hang, is the principal village of Taehŭksan kundo; boats can land on a white sandy beach fronting the village, or on the right bank of a stream which flows out here. There is a small village on the south-eastern shore of the bay, and there is a small mole here which dries alongside; on the southern side of
 25 this village is a hillock 251 feet (76^m5) high. There are depths of less than 3 fathoms (5^m5) throughout the greater part of Chinni hang, except south-eastward of the eastern Eagle islet, where there are depths of from 3½ to 5½ fathoms (10^m1).

Temporary anchorage, in depths of from 14 to 19 fathoms (25^m6 to
 30 34^m7), may be obtained off the northern coast of Taehŭksan do westward of Chinni hang, taking care to avoid the rocks southward of Hojang do (Bluff island), described on page 538. The tidal streams, which run along the eastern and western sides of Taehŭksan do, meet here and are somewhat weaker.

Chart 3365.

The south-western coast of Taehŭksan do, between its southern extremity (*Lat.* 34° 37' N., *Long.* 125° 24' E.) and a point situated about 1½ miles north-westward, is cliffy and is fringed with numerous
 40 rocks above water; the outermost of these consists of two rocks, the higher being 11 feet (3^m4) high, lying close together about mid-way between these two points and 1½ cables offshore. The bay situated about 1½ miles from the southern end of the island is sheltered from easterly winds, but a sea runs into it with south-westerly winds; there are depths of about 7 fathoms (12^m8), mud, in the middle of the
 45 bay, but inshore the bottom is mostly rock. There is a village on the northern side of the inner part of the bay, and there is a quay here, but it dries alongside.

Kumsaeng ch'o, a reef with a least depth of 2 fathoms (3^m7) over it, lies off the entrance to the above bay and about 4 cables offshore;
 50 there are depths of over 11 fathoms (20^m1) close around this reef, and it is not usually marked by tide-rips.

There are depths of about 4 fathoms (7^m3) in the middle of the next bay northward, but the inner part is shoal. There is a hamlet at the head of the bay, and there is a small pier here.

Charts 104, 3480, 1262, 2347.

Chart 3365.

The remainder of the western coast of Taehŭksan do is but slightly indented, and consists mostly of cliffs.

Yōngsan do.—Dangers.—Yōngsan do (East island) is a wooded island lying off the eastern coast of Taehŭksan do, and separated from it by Yōngsan sudo, a passage fully one mile wide; its northern, eastern, and southern coasts are precipitous cliffs, but the land slopes more gradually on the western side, and there are two coves here, only available for boats, with villages at their heads. The summit of the island, a sharp rocky peak, 789 feet (240^m5) high, with some scattered trees on it, is situated in the south-eastern part. Yōngsan do is difficult to identify from eastward, as it does not show up plainly against Taehŭksan do.

The coasts of Yōngsan do are fringed with rocks, with deep water close outside. A grassy islet 137 feet (41^m8) high, lies close off the north-eastern point of the island; a light-brown pointed rock, 61 feet (18^m6) high, lies nearly one cable northward of this islet, and about 1½ cables further northward is a rock which dries 4 feet (1^m2). There are tide-rips between these rocks when the tidal streams are at their strength. Kwang ch'o, a reef with a least depth of 3 fathoms (5^m5) over it, lies half a mile eastward of Yōngsan do; the tidal streams are very strong here, and, except at slack water, this reef is always marked by ripples and overfalls. A rock with a depth of 3½ fathoms (6^m9) over it, lies about 1½ cables off the north-western point of Yōngsan do.

Yōngsan sudo is deep and free from dangers, but vessels passing through it are advised to avoid a bank, with a least depth of 11 fathoms (20^m1) over it, which extends about one mile northward of Yōngsan do, and on which there are overfalls when the tidal streams are at their strength.

Charts 913, 3365.

Changto yōlto.—Tidal streams.—Changto yōlto, a group of islands lying off the western coast of Taehŭksan do, is separated from it by Changto sudo, which is about half a mile wide in its narrowest part.

Taejang do (West island), 896 feet (273^m1) high, the largest and southernmost of the group, is thickly wooded and its coasts are mostly precipitous cliffs. A village stands on the cliff at the northern part of the eastern coast, but landing on the shingle beach at the foot is difficult. There is a small bay, with a shingle beach at its head, on the western side of the southern point of the island. South-westward of Taejang do the tidal streams run north-westward with the rising tide, with a maximum rate of 3½ knots and south-south-eastward with the falling tide, with a maximum rate of 4 knots; overfalls occur with both streams.

Two other islands, Sojang do and Naemangdōk to, 519 and 297 feet (158^m2 and 90^m5) high, respectively, and some rocks, lie north-eastward of Taejang do (*Lat.* 34° 41' N., *Long.* 125° 22' E.), and extend for about 1½ miles.

Changto sudo is obstructed by a ridge, with a least depth of 2½ fathoms (5^m0) in the fairway over it, which connects the south-western extremity of Sojang do to the western coast of Taehŭksan do. In this channel the tidal streams run northward with the rising tide, and southward with the falling tide, with a maximum estimated rate of 2½ and 3½ knots, respectively, but a greater rate may be experienced; when either stream is at its strength there are heavy tide-rips over the ridge, which is then impassable for boats.

Charts 104, 3480, 1262, 2347.

Charts 913, 3365.

Islands and dangers northward of Taehŭksan do.—Anchorages.—

Tidal streams.—Hojang do (Bluff island) is a grass-covered island lying about one mile north-north-westward of the north-western point of Taehŭksan do; its western coast is a perpendicular cliff rising to a sharp summit, 386 feet (117^m6) high, which is a good mark when approaching Chinni hang from north-westward. The eastern coast is also cliffy, but is lower. A shoal, with a least depth of 4½ fathoms (8^m7) over it, lies about 3½ cables southward of Hojang do.

10 Taedun do (North-east island), 540 feet (164^m6) high, the largest of the islands northward of Taehŭksan do, lies with its southern extremity about 6 cables northward of the northern point of Ka do, and is separated from it by a channel which is encumbered with rocks above and below water, and cannot be recommended. The tidal

15 streams in this channel run westward with the rising tide, and eastward with the falling tide; the maximum rate has been estimated at 2½ knots, but this may be exceeded at times.

The coasts of Taedun do are indented by several bays, which afford shelter to small craft with local knowledge. There is good anchorage

20 except with easterly winds, in the inner part of the bay on the south-eastern side, in depths of from 3 to 5 fathoms (5^m5 to 9^m1), mud. A small bay on the south-western coast of Taedun do has depths of about 5 fathoms (9^m1) in the middle.

Tamul to lies close north-westward of Taedun do, and consists of a

25 northern and southern part, which are joined together by a narrow neck of sand and pebbles. The summit of Tamul to is situated on the western side of the northern part, and is 333 feet (101^m5) high and is covered with pine trees. The coasts of the island are mainly cliffs, and the northern coast is fringed by rocks to a distance of about 1½ cables.

30 An enclosed bay lies between the western coast of Taedun do and the eastern coast of Tamul to; the northern entrance to this bay is about 2 cables wide, with a least depth of 10 fathoms (18^m3) in the fairway. The south-western entrance is encumbered with islands and dangers and the fairway is only about one cable wide, with depths

35 of over 5 fathoms (9^m1). There are depths of from 4½ to 17 fathoms (8^m7 to 31^m1) in the middle of this bay, and small vessels with local knowledge can anchor in it, but the tidal streams are strong.

Sŭng do (North island) is an uninhabited island, covered with grass, lying about half a mile north-westward of Tamul to. It has three

40 peaks of which the north-western and highest is 430 feet (131^m1) high. The coasts are cliffy and are fringed by high rocks in places. The passage between Sŭng do and Tamul to is divided into two parts by some high, barren rocks lying off the western entrance, leaving a narrow passage on either side, in which the tidal streams are strong.

45 There is a rock, 153 feet (46^m6) high lying about 1½ cables off the middle of the north-eastern coast of Sŭng do and connected to it by a reef.

Close north-eastward of Sŭng do, and with foul ground between, are two uninhabited islands (Double island) separated from each

50 other by a very narrow passage; Sangjuk to, the western island (*Lat. 34° 46' N., Long. 125° 26' E.*), is 316 feet (96^m3) high and is fringed with rocks. Hajuk to, the eastern island, is 310 feet (94^m5) high; its south-western extremity is a narrow promontory with a large bare rock, 84 feet (25^m6) high, close off it. On the north-

Charts 104, 3480, 1262, 2347.

Charts 913, 3365.

eastern extremity of this island is a prominent crag, 189 feet (57^m6) high, and a prominent pillar-shaped rock (Pillar rock), 143 feet (43^m6) high, lies about one cable north-eastward of this point.

Three bare rocks close together, the middle one of which is 54 feet (16^m5) high, lie about half a mile eastward of the northern extremity of Hajuk to. About 4 cables further east-south-eastward are two bare, pointed rocks almost connected to each other; the south-eastern of these two rocks is 95 feet (29^m0) high. Southward of the two bare rocks the tidal streams run northward with the rising tide, and south-eastward with the falling tide, the maximum rate being about 2 knots; eddies are formed in the vicinity of these rocks when the tidal streams are at their strength.

Yōri am (Sylvia rock), the most dangerous rock in Hūksan chedo, lies about 4 miles north-eastward of Hajuk to and has a depth of 4 feet (1^m2) over it; this rock lies on a steep-to reef, with depths of less than 10 fathoms (18^m3) over it, extending about 2 cables north-westward and southward from the rock. The tidal streams near Yōri am are strong, but it is not always marked by ripples.

Chart 3365.

Maega do.—Islet and dangers.—Anchorage.—Tidal streams.—Maega do (Kō tō) is a wooded island situated about 9 miles westward of Taehūksan do. The island is divided into two parts by a low neck of land, and when seen from a distance north-westward appears as two separate islands; the northern part is 1,188 feet (362^m1) high, and the southern part is 745 feet (227^m1) high, both peaks having clumps of trees on them. The coasts of the island are precipitous cliffs. See views facing page 533.

Mabup'o mal is the rocky southern extremity of the island, and a rock, 58 feet (17^m7) high, lies close westward of it; the tidal streams are strong off this point. In general, the tidal streams run northward with the rising tide, and divide into two at Mabup'o mal, the reverse occurring with the falling tide; the tidal streams appear to turn about one hour after high and low water.

Chukhang p'o, the small bay on the south-eastern side of the neck of land connecting the two parts of Maega do, has a beach of sand and shingle at its head; it affords shelter to small craft with local knowledge during northerly or westerly winds. Some rocks lie off the southern entrance point of the bay and also close off the southern shore; the northern side of the bay is deep. A village is situated at the head of the bay.

Yōn sō consists of three rocks lying within a distance of 3 cables from a point situated about three-quarters of a mile north-westward of Mabup'o mal; the middle and largest rock is 110 feet (33^m5) high. Tano do (Lat. 34° 41' N., Long. 125° 10' E.), an islet 300 feet (91^m4) high, lies nearly one mile northward of Yōn sō.

Several rocks and islets lie within a distance of 8 cables north-westward of Suyōk mal, a rocky point situated at the northern extremity of Maega do; Ko sō, an islet 240 feet (73^m2) high, is the north-westernmost and highest of these; the north-eastern islet is 151 feet (46^m0) high.

Light.—Fog signal.—Radio beacon.—Radio D.F. station.—Storm signals.—A light is exhibited, at an elevation of 308 feet (93^m9), from a white square concrete structure, 46 feet (14^m0) in height, situated

Charts 104, 3480, 1262, 2347.

Chart 3365.

on the northern end of Maega do. A fog signal is sounded from the lighthouse. There is a radiobeacon, and a radio D.F. station, at the lighthouse. Storm signals are displayed; see page 28.

5 **MEAMUL SUDO.—Islets and danger.—Tidal streams.**—Meamul sudo (Single channel) lies between Hüksan chedo and the islands lying off the southern end of the western coast of Korea. This channel is wide and apparently free from dangers in the fairway; there are depths of over 20 fathoms (36^m6) throughout, except for a small
10 bank, with a depth of 13 fathoms (23^m8), lying about 7 miles north-westward of Chuk to (*Lat 34° 13' N., Long. 125° 51' E.*).

Kyomaek to (Single islet) lies in the fairway of Meamul sudo and about 13 miles south-eastward of Yöngsan do (page 537). It rises vertically on its northern side to an elevation of 464 feet (141^m4)
15 and thence slopes down gradually to its southern extremity; the highest parts are covered with trees and grass. See view facing page 533. A reef, with a rock above water on it, extends a short distance from the north-eastern point of the islet.

On the eastern side of Kyomaek to the north-going tidal stream
20 runs from about one hour before to five hours after the time of high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and the south-going stream for the remainder of the time; the maximum rate is 3 knots.

Islands and dangers on the eastern side of Meamul sudo.—Ui kundo.—Anchorage.—Maenggol kundo, the group of islands on the
25 eastern side of the southern entrance to Meamul sudo, has been described on page 530.

Charts 3392, 3365.

Ui do (tō), the largest island of Ui kundo (Gyūji guntō or Ui group),
30 lies with its south-western extremity about 7½ miles north-eastward of Kyomaek to and has several peaks; the summit of the island, is a sharp peak 1,175 feet (357^m1) high, and is a good landmark.

Chart 3365.

Ui man (bay), situated on the western side of the island, affords
35 temporary shelter to vessels with local knowledge, with easterly winds only, in depth of from 2½ to 6 fathoms (4^m1 to 11^m0); the southern side of the bay is formed by a peninsula, 822 feet (250^m5) high, covered with stunted trees and connected to the main part of the island by a low isthmus. A rock, which dries 3 feet (0^m9), lies about
40 one cable north-westward of the southern entrance point of Ui man; a rocky islet 71 feet (21^m6) high, lies about 4 cables south-westward of the northern entrance point of this bay, and there are two rocks above water about one cable off this point. Uido-ri is a village on the eastern side of the island, but landing is difficult on the beach
45 fronting this village owing to the surf. A sandbank, with depths of less than 5 fathoms (9^m1) over it, extends nearly 3 miles southward from the southern side of Ui do; Onak to (Ragged islet), 249 feet (75^m9) high, lies about one mile offshore on the western side of this bank.

Chart 3392.

50 Several islets lie within a distance of 1½ miles off the eastern side of Ui do; Soui do (Shōgyūji tō) the easternmost and largest of these is 271 feet (82^m6) high and has a village on its south-western coast; Paek do (Haku tō), the north-eastern of these islets, is 162 feet (49^m4) high.

Charts 104, 3480, 1262, 2347.

Chart 3392.

Chuk to (Chiku tō) (*Lat. 34° 34' N., Long. 125° 53' E.*), a rocky islet 244 feet (74^m4) high, with a group of trees on its summit, lies about 2½ miles south-eastward of Ui do ; a rock, 107 feet (32^m6) high, lies a quarter of a mile off its northern side, and there are a few houses on its south-eastern side. Pi do (Bi tō), 215 feet (65^m5) high, lies about one mile eastward of Chuk to, and is cliffy except on its northern side. Several islets and rocks lie within a distance of one mile north-westward of Pi do. Hyōngje do (Keitei tō) consists of two rocks close together lying about one mile northward of Pi do ; the southern and higher of the two is 107 feet (32^m6) high.

Charts 3393, 3365.

Ui satae (Gyūji satai) extends nearly 7 miles southward from Chuk to, and has depths of from 2½ to 5 fathoms (5^m0 to 9^m1) over it.

Chart 3393.

Oegong satae (Gaikō satai), with depths of from about 1½ to 5 fathoms (2^m3 to 9^m1) over it, lies eastward of and parallel to Ui satae, with a deep channel, about 2 miles wide, between them.

Charts 3393, 3365.

With the exception of Soyanggan sō (page 530), the islands and dangers bordering Meamul sudo between the southern extremity of Oegong satae and Maenggol kundo are described on page 546.

Charts 913, 3365.

The islets and rocks lying northward of Ui do are described on page 544.

Ch'ilbal to.—Dangers.—Light.—Fog signal.—Radiobeacon.—Radio D.F. station.—Signal station.—Storm signals.—Ch'ilbal to (Shichi-hatsu tō) is an islet, 328 feet (100^m0) high, lying about 10 miles northward of the north-western point of Ui do. *See* view facing page 533. Two rocks, which dry 6 feet (1^m8) lie about 3 cables west-south-westward of the islet. A bank, with depths of from 3½ to 6 fathoms (5^m9 to 11^m0) over it, extends about 1½ miles northward from a position about 3 cables northward of Ch'ilbal to (*Lat. 34° 47' N., Long. 125° 47' E.*).

A light is exhibited at an elevation of 334 feet (101^m8), from a white circular brick tower, 39 feet (11^m9) in height, situated on the summit of Ch'ilbal to. A fog signal is sounded and there is a radiobeacon at the lighthouse. In 1947, this light was reported to have been destroyed.

There is a radio D.F. station on Ch'ilbal to. Passing vessels can communicate with a signal station on the islet. Storm signals are displayed. The banks northward of Ch'ilbal are described on page 545.

Tidal streams.—About 1½ miles eastward of Ch'ilbal to the north-going stream runs from about half-an-hour before to 5½ hours after the time of high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and the south-going stream runs for the remainder of the time ; the maximum rate of either stream is about 4 knots.

Charts 3392, 3393, 913, 3365.

NAJU KUNDO AND APPROACHES.—General remarks.—Naju kundo (Naju group) comprises the numerous islands lying eastward of Ui kundo and Ch'ilbal to, and cover a distance of about 25 miles

Charts 104, 3480, 1262, 2347.

Charts 3992, 3393, 913, 3365.

in a north and south direction. These islands lie in the approach to Mokp'o (page 546), and the main passages along the southern and eastern sides of the group are described with the approaches to
5 Mokp'o.

The group is divided into two main parts. The western part includes five large islands, and is separated from the eastern part, which includes six large islands, by a channel about 3 to 4 miles wide at its northern end, which opens out into a wider basin towards its
10 southern end, and then contracts to little more than one mile wide. This channel is largely filled by numerous islands and extensive drying banks.

Chart 3393.

Western part of Naju kundo.—Islands and dangers.—Channels.—

15 **Tidal streams.**—Hat'ae do (Katai tō), the southernmost large island of Naju kundo, lies with its south-western extremity about 6 miles east-south-eastward of Pi do, and forms the northern side of the entrance to Chongdung hae (page 548); it has several peaks, the one on the south-western extremity 621 feet (189^m3) high, being very
20 prominent. Chisii do (Shijiji tō) a precipitous islet 316 feet (96^m3) high, lies about half a mile off the south-western point of Hat'ae do.
Charts 3392, 3393.

Sangt'ae do (Jōtai tō), a large island 415 feet (126^m5) high, lies close northward of the eastern end of Hat'ae do, and is connected to it
25 by a mud bank which dries, on which two islets are situated. These two islands are separated from Haui do (Kai tō), another large island which lies northward of the western end of Hat'ae do, by a narrow channel in which the tidal streams are very strong, and which is unsuitable as an anchorage; There is a village on the eastern side of
30 Haui do, which is 507 feet (154^m5) high. Sangt'ae do is separated from the southernmost large island of the eastern part of the group by a channel in which there are a number of islets, including Ki do (tō), Taegwa do (Daika tō), Sogi do (Shōki tō), and Kudo do (Kutō tō).

Nūngsan do (Ryōsan tō), 500 feet (152^m4) high, which lies close
35 westward of the northern end of Haui do, and Sin do (Shin tō), south-westward of it, are the largest of a number of islands and rocks lying off the western side of Haui do, the details of which can best be seen from the chart. The summit of Sin do is situated at the southern end of the island, and is 582 feet (177^m4) high and prominent; there
40 is a sharp peak, 369 feet (112^m5) high, on the north-western point of the island.

Taeya do (Daiya tō) is a precipitous island lying about 1½ miles westward of the northern end of Haui do and has a prominent bare summit, 1,061 feet (323^m4) high. Sanui do (Sani tō), (*Lat. 34° 38' N.,*
45 *Long. 125° 56' E.*), an islet 264 feet (80^m5) high, lies about 2 cables off the western extremity of Taeya do; a shoal, with a depth of less than 3 fathoms (5^m5) over it, extends about 6 cables from the north-eastern side of Taeya do, and is continually changing, so that caution is necessary when approaching it. Taeya sudo (Daiya suidō) is the
50 channel between Taeya do and the islands south-eastward; a bank, with a least depth of 6 fathoms (11^m0) over it, lies in its western entrance.

Toch'o do (Tosō tō), 864 feet (263^m3) high, is a large mountainous island lying with its southern extremity about three-quarters of a

Charts 104, 3480, 1262, 2347.

Charts 3992, 3993.

mile northward of Taeya do ; it forms the western side of Palgu p'o (Hakkō ho), which is described on page 544. Toch'o sudo (Tosō suidō) is the channel between Toch'o do and Taeya do, and is the best channel leading to Palgu p'o. Ka do (Ga tō), an islet 185 feet (56^m4) high, lies close off the southern point of Toch'o do and on the northern side of this channel, and a shoal, with a least depth of 19 feet (5^m8) over it, extends about one mile south-westward from the western end of this islet. Taeya sudo is the next best channel leading to Palgu p'o, but the tidal streams are stronger and more irregular than in Toch'o sudo. Sosinp'o (Tō kaku) is the eastern point of Toch'o do. Several islets lie on a drying flat extending off the north eastern side of Toch'o do ; among them are Oema do (Gaima tō), Ma do (Ba tō), Oegaeyak to (Gaikaiyaku tō), Naegaeyak to (Naikaiyaku tō), and Chong do (Sei tō).

Chart 3392.

Pigūm do (Hikin tō) is separated from the northern side of Toch'o do by Pigūm sudo (Hikin suidō), a channel about a quarter of a mile wide, only available for small vessels with local knowledge. The western and north-eastern parts of the island are hilly ; the central part is low-lying, except for a few hillocks. Sagok (Jikoku) san (*Lat. 34° 45' N., Long. 125° 54' E.*), the bare, rocky summit of the island, is situated in the western part and is 831 feet (253^m3) high ; it is very prominent from north-east and south-west, whence it has the appearance of a jagged ridge. Taegok to (Daikyoku tō), 110 feet (33^m5) high, and Chuk to (Chiku tō), 96 feet (29^m3) high, are the largest of several islets and rocks lying within one mile of the south-western corner of Pigūm do. Ung do (Yō tō), 159 feet (48^m5) high, lies a quarter of a mile offshore about 1½ miles north-westward of Chuk to, and a rock, 34 feet (10^m4) high, lies about 6 cables south-westward of it. Several islets lie within one mile of the north-western point of Pigūm do ; Use do (Gyusen tō), 201 feet (61^m3) high, is the largest and northernmost of these. A 16-foot (4^m9) shoal lies about 3 cables north-westward of Use do. Songt'an do (Shōdan tō), 151 feet (46^m0) high, and Tomak to (Dobaku tō), 256 feet (78^m0) high, lie about one and 1½ miles, respectively, north-westward of the north-eastern point of Pigūm do ; they are the largest of a number of islets and rocks off the north-eastern end of Pigūm do, the outermost of which are nearly one mile further offshore ; the positions of all these can best be seen from the chart.

Puk sudo (Hoku suidō) is the northern part of the channel between the two parts of Naju kundo, and leads to Palg'u p'o. It is encumbered with islands, banks and dangers, and is not suitable for large vessels.

A drying flat extends off the south-eastern side of Pigūm do, and on it are a number of islets, including Sinch'ang do (Shinshō tō), Pu do (Fu tō), Manja do (Bammoku tō) and Pimal to (Himatsu tō).

Eastern part of Naju kundo.—Islands and dangers.—Channel.—Chaūn do (Jion tō), the northernmost large island of Naju kundo, lies with its western extremity about 3½ miles northward of the north-eastern point of Pigūm do, and forms part of the north-eastern side of Puk sudo. Tubong (Tōhō) san (*Lat. 34° 53' N., Long. 126° 04' E.*), the summit of Chaūn do, is a prominent rocky peak, 1,188 feet (362^m1) high, situated in the middle of the eastern side of the island ; Ongōm

Charts 913, 3365, 104, 3480, 1262, 2347.

Chart 3392.

(Yogan) san, is a double peak, 398 feet (121^{m3}) high, situated on Chinsō mal (Jinsho matsu), the western extremity of the island, and there is a peculiar rock on the southern of these two peaks. A
 5 number of islands and dangers lie off the south-western and north-western sides of Chaūn do ; the outermost of these are fully one mile offshore, and their positions can best be seen from the chart.

Omt'ae do (Gantai tō), the next large island south-eastward of Chaūn do, is separated from it by a very narrow channel, which
 10 is encumbered with islands and dangers, of which the positions can best be seen from the chart. The summit of Omt'ae do is a prominent rocky peak, 1,162 feet (354^{m2}) high, situated in the north-western part of the island ; there is also a prominent hill, 641 feet (195^{m4}) high, situated on the central promontory on the eastern side of the
 15 island, from which a rocky ridge runs south-eastward and terminates in a prominent cliff. There is flat, arable land around the bases of these hills, and Toch'ang-ni (Dōshōri) the principal village is situated on the western side of the island. P'o do (Ho tō) is the largest of several islands and rocks lying on a drying flat which extends about
 20 1½ miles off the south-western side of Omt'ae do. For description of the light on Omt'ae do, *see* page 556. The islands lying southward of Omt'ae do are described with Sia hae (Jiga kai) on page 551.

Charts 3392, 3393.

Palgu p'o.—Islands and dangers.—Anchorage.—Palgu p'o (Hakkō
 25 ho) lies in the southern part of the channel between the two parts of Naju kundo. Anchorage can be obtained in an area extending about 2 miles eastward from the eastern extremity of Toch'o do. The anchorage is surrounded on all sides by extensive banks, on which numerous islands are situated, and through which there are a number
 30 of channels. The best channels, Toch'o sudo and Taeya sudo, were described on page 543. Among the islands northward of the anchorage are Such'i do (Suichi tō), Oemyōn do (Gaihen tō), No do (Ga tō), Hasach'i do (Kashachi tō), Sangsuch'i do (Josuichi tō), and Nodae do (Rodai tō). Among those eastward of the anchorage are Ok to
 35 (Gyoku tō), Tambaek to (Tanhaku tō), Naeumuk to (Naigyūboku tō), Oeumuk to (Gaigyūboku tō), and Panwol to (Hangetsu tō). Those westward and southward of the anchorage include Migi do (Miki tō), Munbōng do (Monbyō tō), Kanam do (Kangan tō), Changgo do (Chōko tō), Chōng do (Cho tō), Hūk to (Koku tō), Changbyōng do
 40 (Chōbyō tō), Oehwang do (Gaikō tō), and Kae do (Kai tō).

Charts 3392, 913, 3365.

Channel westward of Pigūm do and Toch'o do.—Islets and dangers.
 —Westward of Pigūm do and Toch'o do there is a deep channel, which is bounded westward by Ui kundo (page 540) and some islets
 45 and rocks lying northward of Ui do ; this channel forms one of the approaches to Chongdung hae (page 548).

Charts 913, 3365.

Ch'u do (Hay rock) (Lat. 34° 43' N., Long. 125° 51' E.), the northernmost islet on the western side of the above channel, lies about
 50 5 miles northward of Ui do, and is a prominent rocky islet 93 feet (28^{m3}) high ; a rock, with a depth of 5 feet (1^{m5}) over it, which breaks in rough weather, lies about 1½ cables southward of Ch'u do. Pok to (Flat rock), an islet or rock, 23 feet (7^{m0}) high, lies about three-quarters of a mile southward of Ch'u do. Both these islets are steep-to.

Charts 104, 3480, 1262, 2347.

Charts 913, 3365.

Sōkhwang do (Sekikō tō) is a small grass covered islet, 175 feet (53^m3) high, lying about 1½ miles south-south-eastward of Pok to ; foul ground, with some rocks above water, extends about 2 cables southward from this islet. 5

Chart 3365.

Yu do lies half a mile southward of Sōkhwang do and is 189 feet (57^m6) high; a rock, with a depth of 2 feet (0^m6) over it, on which the sea breaks, lies about one cable south-westward of this islet. Soyu do, 150 feet (45^m7) high, lies about 3 cables south-south-eastward of Yu do. 10

Chart 3392.

Kyōngch'i do (Keichi tō) lies about midway between Ui do and Toch'o do, and has a flat summit, 425 feet (129^m5) high, with some stunted trees on it and a prominent tree clump on the eastern shoulder ; there are cliffs all round the island, and there are some 15 houses on the southern side. Two rocks above water, the outer 139 feet (42^m4) high, lie close off the south-western point, and a prominent black rock, 19 feet (5^m8) high, lies about one cable off the north-western point. Kyōngch'i do divides the channel into two parts, that on the western side is named Kyōngch'iso sudo, 20 (Gyūji suidō), and the eastern one is named Kyōngch'itong sudo (Keichihigashi suidō).

Chongdal am (Jūtatsu gan) is an isolated rock, which dries 11 feet (3^m4), lying about 1½ miles eastward of the eastern point of Kyōngch'i do and on the northern side of the western entrance to Toch'o sudo 25 (page 543) ; the fairway through Kyōngch'itong sudo lies between this rock and Kyōngch'i do.

Chart 3365.

Ui sudo is the channel between the northern extremity of Ui do and Soyu do, and is deep on the northern side, but a bank, with 30 depths of less than 5 fathoms (9^m1) over it, extends about 1½ miles from the north-western coast of Ui do.

Chart 3392.

Light.—A light is exhibited at an elevation of 144 feet (43^m9), from a white square brick tower, 26 feet (7^m9) in height, situated on the eastern 35 extremity of Kyōngch'i do (*Lat. 34° 39' N., Long. 125° 54' E.*).

Tidal streams.—In Kyōngch'itong sudo the tidal streams set northward with the rising tide, and southward with the falling tide, turning about half an hour after high water and low water in Pigūm sudo ; i.e. about 4½ hours after and 1½ hours before the time of high 40 water at Yangtze approaches (Admiralty Tide Tables Standard Port), respectively. The maximum rate of either stream is 4 knots.

In Ui sudo the tidal streams may attain a rate of from 3 to 4 knots.

Local magnetic anomaly.—There is local magnetic anomaly over a considerable area in the channels on either side of Kyōngch'i do, and 45 also in Ui sudo, causing a westerly error of from 3° to 6°.

Islets and banks north-westward of Chaūn do.—O do (U tō) is a prominent rocky islet with a rounded top, 194 feet (59^m1) high, situated about 4½ miles northward of Chinsō mal (page 544).

Odonam satae (Utōminami satai) is a sandbank extending about 50 10 miles south-south-westward from a position about 4 cables southward of O do ; there are depths of from 4 feet (1^m2) to 3 fathoms (5^m5) over the shoaler parts. The southern extremity of the bank lies about 3½ miles eastward of Ch'ilbal to (page 541).

Charts 104, 3480, 1262, 2347.

Chart 3392.

Odobuk satae (Utōkita satai) is a sandbank extending about 6 miles north-north-eastward from a position about a quarter of a mile northward of O do ; it has depths of less than 3 fathoms (5^m5) over it, and one patch in the middle dries one foot (0^m3).

Taech'ima do (Daichiba tō), is a precipitous islet 194 feet (59^m1) high, lying about 5 miles northward of O do. Soch'ima do (Shōchiba tō), 118 feet (36^m0) high, lies about half a mile northward of Taech'ima do, and is a similar islet. Taech'ima t'oe (Daichiba tai) is a sandbank with depths of from one foot (0^m3) to 3 fathoms (5^m5) over it, extending about 6 miles south-south-westward from Taech'ima do. In 1932 the *Heiwa maru* reported a depth of 1½ fathoms (2^m3) about 2½ miles northward of O do.

Kunsō-nyo (Lat. 35° 02' N., Long. 125° 52' E.) is a brown rock, 53 feet (16^m2) high, lying about 5½ miles westward of Taech'ima do. Chasō-nyo, a rock 11 feet (3^m4) high, lies about 3 cables south-eastward of Kunsō-nyo, and a rock awash lies about 2 cables southward of Chasō-nyo. There are shoal depths between Kunsō-nyo and Punam kundo (Funan guntō), situated about 3½ miles north-eastward and described on page 554 ; details of these can best be seen from the chart.

Charts 913, 3365.

Sonyo satae (tai) is a sandbank lying with its northern extremity about 4 miles southward of Kunsō-nyo, and it extends about 2½ miles southward from this position ; the depths over it vary from 1½ to 3 fathoms (2^m3 to 5^m5). Another bank, with a least depth of 4½ fathoms (8^m7) over it, lies about 2 miles westward of Sonyo satae.

Charts 3392, 913, 3365.

All the banks just described are approximately parallel to each other, and are steep-to on both sides ; further details can best be seen from the charts. They are easily seen, as in any wind or sea they are marked by long lines of waves.

Charts 3392, 3393.

APPROACHES TO MOKP'O.—The southern and deepest approach to Mokp'o is through Chongdung hae (Teitō kai) and Sia hae (Jiga kai). The northern approach is through Myōndo sudo (Mentō suidō) (page 555), where the least depth is 4 fathoms (7^m3).

Chart 3393.

Islands and dangers in the south-western and southern approaches to Chongdung hae.—Chok to, situated at the northern end of Chodo p'o, has been described on page 529. Nurok to (Totsugyoku tō) lies nearly three-quarters of a mile westward of Chok to, and has a thickly wooded summit 376 feet (114^m6) high. Che do, (Sai tō), an islet 123 feet (37^m5) high, lies about one mile westward of the northern extremity of Nurok to.

Chart 3365.

About 1½ miles westward of Che do is Turyang sō (Roran yo), a rock 8 feet (2^m4) high ; a rock with a depth of 2 fathoms (3^m7) over it, lies about 4 cables north-eastward of Turyang sō.

Chart 3393.

Oerip to (Gaihei tō) lies with its southern extremity about 6 cables north-north-eastward of Che do and is 363 feet (110^m6) high ; a shoal with a least depth of 27 feet (8^m2) over it, lies within half a mile north-

Charts 104, 3480, 1262, 2347.

Chart 3393.

westward of its northern extremity. Naerip to (Naihei tō), 484 feet (147^m5) high, lies about one mile eastward of Oerip to; there is a village at the head of a shallow bay on the western side of the northern end of this island. A rock with a depth of 6 feet (1^m8) over it, lies nearly one mile north-westward of the northern point of Naerip to, and a 21-foot (6^m4) patch lies about 8 cables eastward of the same point. Paegya to (Hakuya tō) is a rocky island, 435 feet (132^m6) high, lying about 1½ miles eastward of Naerip to; a shoal, with a least depth of 41 feet (12^m5) over it, lies about half a mile westward of this island. Kwa do (Ka tō), an islet 202 feet (61^m6) high, lies about half a mile eastward of the northern extremity of Paegya to; Nong sō (Rō sho), a rock which dries 9 feet (2^m7), lies about 2 cables south-westward of Kwa do and a rock, which dries 6 feet (1^m8), lies about one cable off the northern extremity of this islet.

Sanggal to (Jōka tō) (*Lat. 34° 23' N., Long. 126° 02' E.*), an islet 235 feet (71^m6) high, lies nearly one mile eastward of Kwa do, and Hagal to (Kaka tō), 199 feet (60^m6) high, lies close southward of Sanggal to. Songnam do (Jōnan tō) is a cultivated island, 356 feet (108^m5) high, lying with its southern extremity about three-quarters of a mile north-eastward of Sanggal to; Sōsongnam do (Shōjōnan tō) lies close westward of Songnam do and is 360 feet (109^m7) high. Cho do (Chō tō), situated about one mile westward of Sōsongnam do, rises to an elevation of 406 feet (123^m7) on its western side and is covered with low trees; a rock, 84 feet (25^m6) high, lies close off its eastern side.

Puksong do (Hokushō tō), situated nearly 1½ miles north-westward of Cho do, has a somewhat pointed summit, 432 feet (131^m7) high; a shoal spit extends about 3 cables northward from this islet, and a rock, 146 feet (44^m5) high, lies close off its south-eastern end. Mosa do (Bōsa tō), 232 feet (70^m7) high, lies nearly three-quarters of a mile eastward of Puksong do. Both these islets are covered with low trees.

Oegong do (Gaikō tō), an islet 307 feet (93^m6) high, lies about 2 miles northward of Puksong do, and appears pointed when seen from southward; Chobu do (Setsuyū tō), an islet 264 feet (80^m5) high lies about 2 cables southward of Oegong do, and there is a rock, with a depth of 4 feet (1^m2) over it, between them. Kodok to (Katoku tō), a flat-topped islet 261 feet (79^m5) high, covered with grass, lies nearly half a mile south-eastward of Oegong do.

Tidal streams.—From observations made during spring tides in a position about 3 miles northward of Oerip to, it appears that the tidal streams attain their maximum rate about one hour after and 5 hours before the time of high water at Yangtze approaches (Admiralty Tide Tables Standard Port), and that during 12 hours their directions change through 360° clockwise, roughly as follows:—

Time	Direction	Rate
About 1 hour after H.W. at Yangtze approaches	NNE	2½ knots
" 4 hours " " " "	SSE	1½ "
" 5 " before " " " "	South	2½ "
" 2 " " " " "	WSW	1 knot

At a position about 6 miles westward of Oerip to, observations made during spring tides show that the tidal streams are strongest at about 2 hours after and 4 hours before the time of high water at

Charts 3365, 104, 3480, 1262, 2347.

Chart 3393.

Yangtze approaches ; their directions also alter 360° clockwise in 12 hours, but the changes are not so marked as in the position given above, and are roughly as follows :—

Time	Direction	Rate
About 2 hours after H.W. at Yangtze approaches	North	2½ knots
" 5 " " " " "	East	1½ "
" 4 " before " " " "	South	3 "
" 1 hour " " " "	West	½ knot

5 **Chongdung hae.**—**Islands and dangers.**—**Anchorage.**—Chongdung hae (Teitō kai) is the channel between the north-western coast of Chin do and the south-eastern islands of Naju kundo ; it forms the southern approach to Mokp'ŏ, and can be entered from southward through Changjuk sudo (page 524).

- 10 Kasa do (tō) lies in the middle of the south-western entrance to Chongdung hae, with its southern extremity about 2½ miles eastward of Oegong do. This island is hilly, the only flat land being at the head of a bay, entirely filled by a mud flat which dries, on the north-eastern side of the island. Chu (Shu) san, the summit of the island, 15 is situated in the northern part, and is a double peak 602 feet (183^m5) high ; Tae (Dai) san, at the southern end of the island, is 543 feet (165^m5) high. These two hills are prominent from westward, but from southward only the northern one stands out. Ma do (Ba tō) is a bare, flat islet, 208 feet (63^m4) high, lying about three-quarters of 20 a mile westward of the southern point of Kasa do, and close off this point is a prominent rock, 224 feet (68^m3) high, named Taesodong do (Daishōdō tō). Vessels proceeding northward from Changjuk sudo can pass on either side of Ma do, as the channels are deep.

Pul to (Butsu tō) lies nearly 1½ miles south-eastward of the southern 25 point of Kasa do (*Lat. 34° 27' N., Long. 126° 03' E.*), and is an islet 248 feet (75^m6) high, with a group of trees on its summit.

A chain of islets and rocks lies from half a mile to about one mile off the northwestern coast of Chin do on the eastern side of the entrance to Chongdung hae, Kakhül to (Kakukitsu tō), the southernmost 30 of these, lies about one mile south-eastward of Pul to and is a prominent rocky islet, 327 feet (99^m7) high ; during foggy weather, vessels frequently anchor about one mile southward of this islet. Kok to (Kyoku tō) lies about half a mile north-north-eastward of Kakhül to and is 166 feet (50^m6) high ; Chamdu do (Santō tō), 61 feet (18^m6) 35 high, lies about 2 cables north-eastward of Kok to. Chang do (Chō tō), the northernmost and largest islet, lies about three-quarters of a mile northward of Chamdu do and has two summits, the northern and higher being 267 feet (81^m4) high. The passage between this chain of islets and Pul to is used by vessels proceeding through Chongdung hae 40 from Changjuk sudo.

Chuji do (Shushi tō) lies about half a mile eastward of Kasa do and is 625 feet (190^m5) high ; there is a large, prominent boulder on its summit, and it is the best landmark in the neighbourhood. A shoal, with a rock 19 feet (5^m8) high on its outer end, extends about a 45 quarter of a mile from the western side of Chuji do. Yangdōk to (Ryōtokō tō), 431 feet (131^m4) high, lies about 6 cables eastward of Chuji do, and has a rock of peculiar shape on its summit ; this islet is thickly covered with pine trees and is a good landmark.

Charts 3365, 104, 3480, 1262, 2347.

Chart 3393.

Man sŏ (Ban sho), a rock 9 feet (2^m7) high, lies about one mile north-westward of the northern extremity of Kasa do and nearly in the middle of the northern channel in the south-western entrance of Chongdung hae; a rock, with a depth of 6 feet (1^m8) over it, lies about $1\frac{1}{2}$ cables west-north-westward of this rock. A bank, with a least depth of 39 feet (11^m9) over it, lies within one mile north-westward of Man sŏ. 5

About midway between Yangdŏk to and Hat'ae do (page 542) is a group of four islets. Kwangdae do (Kōtai tō), the north-eastern 10 and largest of these, lies about 2 miles northward of Yangdŏk to and is 248 feet (75^m6) high; it has a high, prominent cliff on its eastern side, and in 1928 there were some dwellings on its north-western side. The other three islets lie close together south-westward of Kwangdae do, and Song do (Shō tō), the easternmost of these, is 142 feet (43^m3) 15 high and lies about half a mile south-westward of Kwangdae do; the other two are connected to each other by a shingle bank which dries. The depths in the vicinity of these islets, and between them and Kasa do, are irregular. Ton sŏ (sho) a rock 9 feet (2^m7) high, lies near the middle of the channel between these islets and 20 Hat'ae do.

Panggu do (Hōkō tō) consists of three precipitous islets lying close together nearly $1\frac{1}{4}$ miles south-eastward of Kwangdae do; the north-eastern and largest of these is 244 feet (74^m4) high. These islets lie on a bank, with depths of from 5 to 10 fathoms (9^m1 to 18^m3) over 25 it, extending about 3 miles north-eastward from Yangdŏk to.

A rock 6 feet (1^m8) high and steep-to, lies about one mile south-eastward of Yangdŏk to and on the south-eastern side of the fairway through Chongdung hae. Che do (Cho tō), an islet 175 feet (53^m3) high, with some dwellings on its southern side, lies about $2\frac{1}{4}$ miles 30 north-eastward of Yangdŏk to and about 6 cables off the north-western coast of Chin do. South-eastward of the line joining this islet and the 6-foot (1^m8) high rock just mentioned are several rocks and sandbanks; one of these, 19 feet (5^m8) high, lies about midway between the two. A rock, with a depth of 5 feet (1^m5) over 35 it, lies about half a mile east-north-eastward of the eastern point of Che do, and depths of 24 and 34 feet (7^m3 and 10^m4) lie, respectively, about 3 cables northward and 6 cables north-eastward of the same point.

Chakto do (Sakuriki tō) (*Lat. $34^{\circ} 32' N.$, Long. $126^{\circ} 10' E.$*), a cliffy 40 islet with a flat summit, 166 feet (50^m6) high, lies nearly $1\frac{1}{4}$ miles north-north-eastward of Che do and in the middle of the main fairway through Chongdung hae; a bank with depths of less than 10 fathoms (18^m3) over it, extends about one mile eastward from Chakto do.

A rock, 3 feet (0^m9) high, lies about 4 cables off the coast of Chin 45 do about 2 miles eastward of Chakto do; a shoal, with depths of less than 6 fathoms (11^m0) over it, extends about one mile south-westward from this rock.

Song do (Shō tō), a round-topped islet 156 feet (47^m5) high, with a single pine tree on it, lies nearly 2 miles north-eastward of Chakto do; 50 a rock, with a depth of 33 feet (10^m1) over it, lies about 4 cables north-north-eastward of Song do. Kol to (Kotsu tō), 123 feet (37^m5) high, lies about half a mile east-south-eastward of Song do; a rock, above water, lies about one cable off its western end.

Charts 3365, 104, 3480, 1262, 2347.

Charts 3392, 3393.

A sandbank, with a least depth of 3 fathoms (5^m5) over it, extends about three-quarters of a mile northward from a position nearly half a mile north-eastward of Kol to.

- 5 Yul to (Ritsu tō) lies fully one mile north-westward of Song do, and is the northernmost and largest of three islets close together; it has two summits of about the same elevation, and on the southern of these is a group of pine trees, the tops of which are elevated 238 feet (72^m5). There is a village on the eastern coast of Yul to. The central islet is named Cheryul to (Sairitsu tō), and the southern one is
10 Ku do (Ki tō); both these are 113 feet (34^m4) high. Depths of less than 5 fathoms (9^m1) extend about half a mile south-westward from Ku do.

- Kosa do (tō), situated about 2 miles westward of Ku do, is a
15 prominent conical islet, 461 feet (140^m5) high. P'yōngsa do (Heisa tō), lying close northward of Kosa do, has a rounded summit, 116 feet (35^m4) high; it is well cultivated, and there is a village on its south-eastern side. These two islets lie on a shoal, with depths of less than 3 fathoms (5^m5) over it, which extends about one mile south-westward
20 from Kosa do. An islet 80 feet (24^m4) high, lies off the eastern side of P'yōngsa do.

A bank, with depths of less than 3 fathoms (5^m5) over it, extends about one mile off the southern side of Changsan do (Chōsan tō), a large island situated northward of P'yōngsa do.

- 25 Chok to (Soku tō), 185 feet (56^m4) high, lies about 6 cables north-westward of Yul to, and a rock with a depth of 21 feet (6^m4) over it, lies about a quarter of a mile south-westward of this islet. An isolated steep-to rock, with a depth of 6 feet (1^m7) over it, lies about 1½ miles north-eastward of Yul to; owing to the muddy state of
30 the water, the position of this rock is not easily discerned.

Chart 3393.

Lights.—A light is exhibited, at an elevation of 220 feet (67^m1), from a white circular brick tower, 24 feet (7^m3) in height, on the southern point of Kasa do (*Lat. 34° 28' N., Long. 126° 03' E.*)

- 35 *Charts 3392, 3393.*

A light is exhibited, at an elevation of 90 feet (27^m4), from a white circular brick tower, 24 feet (7^m3) in height, on Ku do.

Chart 3393.

- Tidal streams.**—Off the south-western entrance to Chongdung hae,
40 between Chang do and Kasa do, the tidal stream runs north-eastward from about 2½ hours before to 4 hours after the time of high water at Yangtze approaches (Admiralty Tide Tables Standard Port), with a maximum rate of about 3 knots; for the remainder of the time the stream runs south-westward, with a maximum rate of about 4 knots.
45 About midway between Kasa do and Hat'ae do the tidal stream runs eastward from about one hour before to 5 hours after the time of high water at Yangtze approaches, with a maximum rate of about 2½ knots; for the remainder of the time the stream runs westward, with a maximum rate of about 3 knots.

- 50 *Charts 3392, 3393.*

At the north-eastern end of Chongdung hae, between Ku do and Song do, the tidal streams run north-eastward with the rising tide, and south-westward with the falling tide, turning to south-westward about 4½ hours after, and to north-eastward about 1½ hours before

Charts 3365, 104, 3480, 1262, 2347.

Charts 3392, 3393.

the time of high water at Yangtze approaches; the maximum rate of the former is about 3 knots, and that of the latter about 4 knots.

Sia hae.—Islets and dangers.—Sia hae (Jiga kai), the channel between the south-eastern islands of Naju kundo and Hwawŏn pando (Kagen hantō), a peninsula on the coast of the mainland immediately northward of Myongyangdo sudo (page 521), is a continuation northward of Chongdung hae.

The bottom throughout this channel is very irregular, and there are several rocky islets on either side of the fairway.

Changsan do (Chōsan tō), a large island situated on the western side of the southern entrance to Sia hae, lies with its eastern extremity about 3 miles northward of Yul to; there are several hills on this island, but the only prominent one is Oum (Goon) san (*Lat. 34° 40' N., Long. 126° 09' E.*), 677 feet (206^m3) high, situated on the northern extremity. The western side of Changsan do forms the south-eastern side of Palgu p'o (page 544); the channels northward and southward of Changsan do, leading into Palgu p'o, are narrow, intricate, and only suitable for small craft with local knowledge. Changjin do (Bashin tō), a flat-topped island 74 feet (22^m6) high, lies close south-eastward of the eastern extremity of Changsan do and is the largest of a number of islands and rocks extending up to about 1½ miles off the south-eastern side of Changsan do, the details of which can best be seen from the chart.

Imha do (Rinka tō) and Chung do (Shō tō) are islands lying off the coast of Hwawŏn pando, eastward of Changjin do; the latter is 366 feet (111^m6) high. An islet, 54 feet (16^m5) high, lies about 2½ miles north-eastward of the eastern point of Changjin do and about 4 cables off the eastern shore of the channel; Chakto do (Shakutō tō), an islet 77 feet (23^m5) high, lies about 1½ miles northward of the above islet and on a spit which extends about a quarter of a mile from the eastern shore. Ko do (tō), 41 feet (12^m5) high, lies about 4 cables south-south-eastward of Chakto do.

Chara do (Shara tō), 343 feet (104^m5) high, and Hongam do (Kyūgan tō), 218 feet (66^m4) high, are the largest of several islands and rocks lying between Changsan do and Anch'ang do (Anshō tō), the next large island northward, which is 490 feet (14^m23) high. Changsan sudo (Chōsan suidō) is the channel between Changsan do and these two islands, and leads to Palgu p'o.

Ch'i do (Chi tō), 51 feet (15^m5) high, lies on the western side of the fairway of Sia hae, and about 2 miles westward of Chakto do, and about 1½ miles west-south-westward of it is another islet of the same name, 61 feet (18^m6) high. Hwa do (Ka tō) is an islet lying close off the south-eastern side of Hongam do; Taep'o t'an, a rock above water, lies about 7 cables eastward of this islet, with a rock, which dries 6 feet (1^m8), off its north-western side.

Siha do (Jika tō) lies nearly 1½ miles northward of Chakto do and on the eastern side of the fairway, and has a flat summit, 110 feet (33^m5) high; there is a prominent clump of trees eastward of the lighthouse (page 552), and a small village is situated on the eastern side.

A shoal, with depths of less than 5 fathoms (9^m1) over it, extends nearly one mile southward from the southern side of Siha do; the shoalest spot, with a depth of 3 feet (0^m9) over it, lies about half a mile south-south-eastward of the islet. A bank, with general depths

Charts 913, 3365, 104, 3480, 1262, 2347.

Charts 3392, 3393.

of from $3\frac{1}{2}$ to 5 fathoms (6^m4 to 9^m1) over it, extends about 2 miles northward from Siha do, but on the shoalest spot, nearly $1\frac{1}{2}$ miles north-north-eastward from the islet, there is a depth of only 14 feet (4^m3).

A rock, with a depth of 6 feet (1^m8) over it, lies nearly one mile west-south-westward of Siha do; a rocky ledge, with depths of less than 10 fathoms (18^m3) over it, extends about half a mile southward from this rock.

- 10 Yoryōk to (Yoriki tō), a flat-topped islet 133 feet (40^m5) high, with a group of trees on its southern extremity, lies about 3 miles north-westward of Siha do, and is one of several islets and rocks lying on the mud bank which extends about half a mile from the eastern side of Anch'ang do. Musim t'an, a rock 16 feet (4^m9) high, lies about
15 half a mile south-south-eastward of Yoryōk to. A rock, with a depth of 9 feet (2^m7) over it, lies about half a mile eastward of Yoryōk to.

Pulmugi do (Fumuki tō), situated nearly $3\frac{1}{2}$ miles northward of Siha do, is a flat islet, 70 feet (21^m3) high, covered with grass, and is a useful mark in clear weather. A shoal, with depths of less than 5
20 fathoms (9^m1) over it, extends about 4 cables northward from Pulmugi do, and a shoal, with a least depth of 29 feet (8^m8) over it, lies about three-quarters of a mile northward of this islet. A rocky patch, with a least depth of 17 feet (5^m2) over it, lies nearly $1\frac{1}{2}$ miles south-eastward of Pulmugi do. Shoals, with depths of from 15 to 29
25 feet (4^m6 to 8^m8) over them, lie about $2\frac{1}{2}$ miles eastward of Pulmugi do (*Lat. $34^\circ 45' N.$, Long. $126^\circ 13' E.$*), and within one mile of the north-western extremity of Hwawōn pando. The islets and dangers northward of Pulmugi do are described with the northern approach to Mokp'ō; see page 556.

- 30 Kijwa do (Kisa tō), 592 feet (180^m4) high, is a large island lying close westward of Anch'ang do, and P'algun do (Hachikin tō), another large island, is separated from the northern sides of these two islands by a narrow channel; the north-eastern extremity of P'algun do is a peninsula with a prominent rocky peak on it, 461
35 feet (140^m5) high.

Chart 3392.

A narrow channel separates P'algun do from Omt'ae do, which was described on page 544. Extensive drying flats, on which a number of islets are situated, lie off the eastern and north-eastern sides of
40 P'algun do.

Charts 3392, 3393.

Light.—A light is exhibited, at an elevation of 122 feet (37^m2), from a white circular concrete tower, 32 feet (9^m8) in height, on the north-western part of Siha do.

- 45 **Tidal streams.**—Near the middle of the passage through Sia hae the tidal streams run northward with the rising tide, and southward with the falling tide; the tidal streams turn to southward about $4\frac{1}{2}$ hours after and to northward about $1\frac{1}{2}$ hours before the time of high water at Yangtze approaches (Admiralty Tide Tables Standard
60 Port), and their maximum rate is 4 knots.

The direction of the tidal streams about one mile eastward of Pulmugi do is the same as in the middle of Sia hae, but the maximum rate of the north-going stream is about $1\frac{1}{2}$ knots, and that of the south-going stream about 2 knots.

Charts 913, 3365, 104, 3480, 1262, 2347.

Charts 3392, 3393.

Directions.—For vessels proceeding to Mokp'o through Chongdung hae the recommended track from westward passes southward of Puksong do and Mosa do (page 547), and thence between Kasa do and Pul to. Vessels from south-eastward, having passed through Changjuk sudo (page 524), can pass eastward of Pul to.

Proceeding north-eastward through Chongdung hae the track passes either side of Yangdök to (page 548) and Panggu do; if passing south-eastward of Yangdök to vessels must pass north-westward of Che do and the dangers lying south-westward of this islet. Chakto do (page 549) can be passed on either side, and the track then runs between Song do and Ku do.

When about 2 miles northward of the northern extremity of Chin do, and Ilsöng bong (Nissei hō), a peak on the eastern side of Hwawōn pando 1,094 feet (333^m4) high, bears 074°, a northerly course should be set to pass through Sia hae. A mid-channel course should be steered between Siha do (*Lat. 34° 42' N., Long. 126° 15' E.*) and the rock, with a depth of 6 feet (1^m8) over it, lying about one mile west-south-westward of this island; the summit of Yök to (Eki tō), an islet 375 feet (114^m3) high, lying about 5 miles northward of Pulmugi do, bearing about 356° and just open eastward of the latter, leads eastward of this rock. Course should then be shaped to pass eastward of Pulmugi do and the shoal, with a least depth of 29 feet (8^m8) over it, lying northward of this islet, and continuing far enough northward so as to approach Mokp'o gu (Mokuho kuchi) (page 557) on an east-south-easterly course; when between Siha do and Pulmugi do care must be taken to avoid the bank which extends northward from the former. Directions for entering Mokp'o hang (Mokuho kō) are given on page 561.

Chart 3392.

Northern approach to Mokp'o.—Islands and dangers.—Anchorage.

Directions.—Tidal streams.—On the eastern side of the northern approach to Mokp'o are numerous islands and banks which extend some 10 miles from the coast northward of Mokp'o; the northern part of the western side is formed by four groups of islets.

Pich'i to (Hichi tō), the northernmost group, consists of two uninhabited cliffy islets, covered with grass, the south-eastern of which lies about 17½ miles north-north-westward of the northern point of Chaün do (page 543); these islets are connected by a shoal bank, but are otherwise steep-to; the depths around them are irregular. Taebich'i do (Daihichi tō), the eastern islet, is 338 feet (103^m0) high; Sobich'i do (Shōhichi tō), the western islet, is 276 feet (84^m1) high. A 34-foot (10^m4) shoal lies about a quarter of a mile northward of Taebich'i do.

A 6½-fathom (12^m3) patch is situated about 7 miles west-north-westward of Pich'i to.

Hōsa kundo (Kyosa guntō) consists of two uninhabited grass-covered islets, with some off-lying rocks. Taehōsa do (Daikyosa tō), the eastern of the two, is 351 feet (107^m0) high and lies nearly 4 miles southward of Taebich'i do, and is steep-to on its eastern and western sides; a shoal, with depths of less than 3 fathoms (5^m5) over it, extends about one mile north-eastward from its northern side and another, with depths of less than 6 fathoms (11^m0) over it, extends 6 cables south-south-westward from its southern side. Two rocks,

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Chart 3392.

- the highest 72 feet (21^m9) high, lie within 2 cables of the north-eastern side of Taehōsa do, and a rock, 69 feet (21^m0) high, lies close off its eastern point; a rock, 115 feet (35^m1) high, and a reef
 5 which dries 9 feet (2^m7), lie within 2 cables of the southern side of the same islet. Sohōsa do (Shōkyosa tō) (*Lat. 35° 08' N., Long. 125° 53' E.*) the western islet, is 325 feet (99^m1) high and clifty; a shoal, with depths of less than 3 fathoms (5^m5) over it, extends about 1½ miles south-south-westward from it.
- 10 Punam kundo (Funan guntō) is a group of several islets and rocks lying on a shoal bank. Punam do (Funan tō), the northernmost islet, is 384 feet (117^m0) high and lies about 2½ miles southward of Taehōsa do and has cliffs all round; there is a shingle beach on its southern side, and a few dwellings stand on the cliffs above. A prominent
 15 rock, 40 feet (12^m2) high, with a smaller rock close westward of it, lies about three-quarters of a mile eastward of Punam do. Three small islets and some rocks lie off the southern side of Punam do. Immo do (Ryūbō tō), 302 feet (92^m0) high, is a clifty islet lying nearly three-quarters of a mile southward of Punam do, and there is a group
 20 of trees on its summit. Kul to (Kutsu tō), 207 feet (63^m1) high, lies about 3 cables south-eastward of Immo do. Kal to (Katsu tō), lying nearly half a mile eastward of Kul to, has two peaks, and there is a prominent group of trees on the southern and higher, which is 348 feet (106^m1) high; there are a few dwellings on the western side
 25 of this islet. For further details of this group the chart should be consulted. Small vessels with local knowledge can obtain anchorage off the southern side of Punam do with northerly winds, and off the western side of Kal to with easterly winds.

- Rorok to is a group of two islets lying about 3 miles north-eastward
 30 of Kal to; Taerorok to (Dairōroku tō), the northern islet, is clifty and 342 feet (104^m2) high; Sororok to (Shōrōroku tō), the southern islet, is 227 feet (69^m2) high. Shoals, with a least depth of 13 feet (4^m0) over them, extend about three-quarters of a mile northward from Taerorok to. A rock, 26 feet (7^m9) high, lies close off the
 35 western side of Sororok to. A 17-foot (5^m2) patch lies about 2½ miles northward of Taerorok to, and, in 1937, depths of less than 3 fathoms (5^m5) were reported within a distance of half a mile south-westward of this position. In 1930 the *Tsugaru maru*, with a draught of 15 feet (4^m6), reported having grounded about 4½ miles northward of
 40 Taerorok to. The channel between Sororok to and Punam kundo is only suitable for small craft.

- Punam kundo and Rorok to (*Lat. 35° 06' N., Long. 125° 59' E*) lie on a sandbank which extends north-north-eastward towards Kagi do (Kakuji tō) and the other islets and banks in this direction,
 45 which are described on page 565. The depths in the fairway over this bank, which must be crossed by vessels using the northern passage to Mokp'ō, are from 4 to 5 fathoms (7^m3 to 9^m1).

- Imja do (Jinshi tō) is a large island lying with its south-western extremity about 3 miles south-eastward of Taerorok do; it has
 50 several peaks, and Daiton (Taedun) san the summit of the island, 1,053 feet (321^m0) high, situated in the southern part, is a good landmark. The north-western coast consists of a sandy beach about 4 miles long, off which a bank, with depths of less than 3 fathoms (5^m5) over it, extends fully one mile; there are several rocky islets

Charts 913, 3365, 104, 3480, 1262, 2347.

Chart 3392.

off the outer edge of this bank, and Hwagari do (Kakari tō), the outermost of these, lies about $1\frac{1}{2}$ miles offshore and is 119 feet (36^m3) high. Close off the south-western end of the sandy beach are two islets; Taedaei do (Daidaiji tō), the western and larger of the two, 5 has a wooded summit 332 feet (101^m2) high to the tops of the trees. Chaewōn do (Zaien tō), an island with a prominent conical summit 801 feet (244^m1) high, lies westward of Imja do, from which it is separated by Chaewōndong sudo (Zaienhigashi suidō), a deep channel obstructed by some islets in its northern entrance, the posi- 10 tions of which can best be seen from the chart.

The southern and eastern coasts of Imja do are indented by several bays, but they are all filled with flats which dry. A bank, with depths of less than 3 fathoms (5^m5) over it, extends fully 2 miles from the southern side of the island. 15

Vessels proceeding to Mokp'o from northward generally use Chaewōnso sudo (Zaiennishi suidō), the channel between Taerorok do and Chaewōn do, which is fully one mile wide, deep, and free from dangers. In both Chaewōnso sudo and Chaewōndong sudo, the tidal streams run northward with the rising tide, and southward with the 20 falling tide, with a maximum rate of $3\frac{1}{2}$ knots; the streams turn to southward about 5 hours after, and to northward about one hour before the time of high water at Yangtze approaches (Admiralty Tide Tables Standard Port).

Soch'ima do, situated about $1\frac{1}{2}$ miles south-eastward of Kal to, and 25 the adjacent banks, have been described on page 546. After passing through Chaewōnso sudo the fairway lies between the northern extremity of Odobuk satae and the bank extending from the southern side of Imja do; the least depth here is 4 fathoms (7^m3). The track then leads south-eastward, towards the entrance of Myōndo sudo. 30

Light.—A light is exhibited, at an elevation of 224 feet (68^m3), from a white circular concrete tower, 15 feet (4^m6) in height, situated on the south-eastern part of Taerorok to (*Lat. $35^{\circ} 06' N.$, Long. $125^{\circ} 59' E.$*).

Myōndo sudo.—**Islands and dangers.**—**Tidal streams.**—Myōndo sudo (Mentō suidō) is the channel entered between the north-eastern 35 side of Chaūn do (page 543) and Hujūng do (Kōsō tō) and Chōnjung do (Usō tō), two large islands, 450 and 348 feet (137^m2 and 106^m1) high, respectively, which, together with numerous islets and rocks, lie on a mud bank, which dries, north-eastward of Chaūn do; the southern extremity of the southern island, lies about $3\frac{1}{2}$ miles east- 40 north-eastward off the northern extremity of Chaūn do. Although the entrance to this channel is about 2 miles wide, the rocks and shoals on either side reduce the navigable width, with a least depth of 4 fathoms (7^m3), to about half a mile; the positions of these rocks and shoals can best be seen from the chart. Oekal to (Gaikatsu 45 tō) lies about half a mile south-westward of the western point of Hujūng do, and is a prominent conical islet, 109 feet (33^m2) high, covered with grass. Myōn do (Men tō), 92 feet (28^m0) high, and Hang do (Kō tō), 69 feet (21^m0) high, are among the islets off the southern extremity of Chōnjung do. Hwa do (Ka tō), 122 feet 50 (37^m2) high, lies on the mud bank southward of Chōnjung do. Chaewōn do (Zaien tō), an islet 96 feet (29^m3) high, shaped like a helmet and covered with grass, lies in the middle of the channel and about 3 miles south-south-eastward of the southern extremity

Charts 913, 3365, 104, 3480, 1262, 2347.

Chart 3392.

of Chōndung do. The fairway of the channel is westward of this islet, after passing which the channel narrows to about three-quarters of a mile between the north-eastern extremity of Omt'ae do (page 544) and a group of islands and rocks, including Tangsa do (Tōsa tō), 263 feet (80^m2) high, lying on a shoal flat on the eastern side of the fairway; the details of these can best be seen from the chart.

The tidal streams in Myondo sudo run northward with the rising tide, and southward with the falling tide; near Oekal to the north-
10 going stream may attain a rate of over 3 knots.

After passing the eastern point of Omt'ae do, the fairway to the entrance to Mokp'ŏ is approximately on the line joining this point and the northern extremity of Hwawōn pando. Aphae do (Okai tō), well wooded and fertile, lies on the north-eastern side of the fairway, with
15 its western extremity about 3½ miles east-south-eastward of the eastern point of Omt'ae do (*Lat. 34° 52' N., Long. 126° 10' E.*); this large island is irregular in shape and surrounded by a mud flat, which dries. Songhyo (Sōkō) san is a prominent conical peak, 743 feet (226^m6) high, situated on the south-western extremity of Aphae
20 do, and close off this point is Yōk to (Eki tō), a prominent islet with a sharp summit 375 feet (114^m3) high. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about 2½ miles southward from Aphae do, and is covered by the *red* sector of Mokp'ŏ-gu light (page 558) between the bearings 135° and 204°.

25 Amch'i do (Ganji tō), 100 feet (30^m5) high, lies on the western side of the fairway about 2½ miles west-south-westward of Yōk tō, and is the outermost of several rocks and dangers off the entrance to the channel between Omt'ae do and P'algun do (page 552).

Charts 3392, 3393.

30 There are several islets on the western side of the fairway off the eastern coast of P'algun do, and the principal of these are: Hanaptōk to (Kanōtoku tō), the easternmost and 38 feet (11^m6) high, situated nearly 3 miles northward of Pulmugi do (page 552); Ko do (tō) lying nearly 1½ miles westward of Hanaptōk to and 28 feet
35 (8^m5) high; Sangnaptōk to (Jōnōtoku tō), situated about 6 cables south-westward of Hanaptōk to and 57 feet (17^m4) high; Yong do (Ryū tō), a prominent dark islet 139 feet (42^m4) high, the southern half of which is wooded, lying about half a mile south-south-westward of Sangnaptōk to; Kwangsa do (Kosa tō), about three-quarters of a
40 mile south-westward of Yong do and 87 feet (26^m5) high. There are irregular depths and several shoals westward of the line joining Hanaptōk to and Pulmugi do, and this area should be avoided; it is covered by a *red* sector of Mokp'ŏ-gu light between the bearings 107° and 129°.

Chart 3392.

Light.—A light is exhibited, at an elevation of 118 feet (36^m0), from a white circular brick tower, 23 feet (7^m0) in height, situated on the eastern point of Omt'ae do.

Charts 3392, 3393, 913, 3365.

50 **MOKP'Ō HANG.**—**General remarks.**—Eastward of the northern part of Hwawōn pando are the three peninsulas Haenam pando (Kainan hantō), Yōngam pando (Reigan hantō), and Muan pando (Buan peninsula). Between these peninsulas are three rivers, which

Charts 104, 3480, 1262, 2347.

Charts 3392, 3393, 913, 3365.

unite off the western end of Yōngam pando and are entered by a deep channel along the northern extremity of Hwawōn pando. Hwawōn gang (Kagen kō), the southern of these three rivers, flows between Hwawōn pando and Haenam pando; Haenam gang (Kainan kō) flows between Haenam pando and Yōngan pando; Yōngsan gang (Eizan kō) flows between Yōngam pando and Muan pando. Hwawōn gang and Haenam gang are more in the nature of creeks than rivers, and a few miles within their entrances the depths decrease rapidly. Mokp'o hang (Mokuho kō) is situated off the town of Mokp'o (*Lat. 34° 47' N., Long. 126° 23' E.*), which is situated on the southern extremity of Muan pando and on the northern bank of Yōngsan gang. Small steamers can navigate Yōngsan gang for about 36 miles to the town of Yōngsanp'o.

Chart 1558, plan of Mokuho kō, Charts 3392, 3393.

Entrance channels.—Islands and dangers.—Light-buoy.—The entrance to Mokp'o hang from Sia hae lies between the northern extremity of Hwawōn pando and the southern extremity of Aphae do, situated about $3\frac{1}{2}$ miles north-north-eastward, but it is considerably obstructed by a number of islands, between which are three channels. Only the southern of these, known as Mokp'o gu (Mokuho kuchi), is available for shipping; the remaining two, named Chung gu (Nakano kuchi) and Puk ku (Kitano kuchi), are only suitable for small craft.

Mokp'o gu, situated between the northern extremity of Hwawōn pando and the southern extremity of Talli do (Tatsuri tō), is about 3 cables wide, with depths of about 16 fathoms (29^m3), and is free from dangers.

Oedal to (Gaitatsu tō), situated about three-quarters of a mile northward of the northern extremity of Hwawōn pando, is a hilly island, 202 feet (61^m6) high, covered with pine trees, and there is a village on its south-western side. Rocks and shoals extend about 4 cables from the western side of the island, and a rock, 16 feet (4^m9) high, lies about 2 cables off the southern coast.

Chart 1558, plan of Mokuho kō.

Talli do is separated from Oedal to by a narrow channel with depths of over 6 fathoms (11^m0) in the fairway; this island is also hilly and covered with pine trees, and there is a village on the eastern side. Sach'i (Jiji) san and Kūmsong (Kinjō) san, each 451 feet (137^m5) high, are the highest points on Talli do. The north-eastern extremity of Talli do is Ch'ōnch'ūk pi (Tensoku bi), a prominent hillock 70 feet (21^m3) high, densely wooded and dark in appearance, connected to the main island by a narrow spit of sand. Pak pi (Haku bi) is a point situated about half a mile south-south-westward of Ch'ōnch'ūk pi. Sodwiyang do (Shōtōryō tō), 67 feet (20^m4) high, lies close eastward of the northern extremity of Talli do.

Nul to (Totsu tō) lies close northward of Talli do and is separated from it by Chung gu (Nakano kuchi); a range of hills, covered with pine trees, runs along the eastern side of this island, and its summit, Nulto bong (Totsutō hō), 330 feet (100^m6) high, is flat. Chung gu is shallow throughout the greater part and the tidal streams are strong; Maek to (Baku tō), an islet 70 feet (21^m3) high, lies in the middle of the western entrance, and Changja do (Chōsa tō) and U do (Gyū tō) lie in the eastern entrance. Changja do has a densely wooded summit, 238 feet (72^m5) high, and U do is 84 feet (25^m6) high.

Charts 104, 3480, 1262, 2347.

Chart 3392.

Puk ku (Kitano kuchi) the narrow channel between the northern extremity of Nul to and the southern extremity of Aphae do, is shallow and the tidal streams are strong; its eastern entrance is encumbered with islets and rocks, including Kurye do (Kyūrei tō), 93 feet (28^m3) high.

Chart 1558, plan of Mokuho kō.

- After passing through Mokp'o gu the channel leading to Mokp'o hang turns sharply northward along the eastern side of Talli do.
- 10 Koha do (Kōge tō), 264 feet (80^m5) high, lies on the eastern side of this part of the channel and close off the western extremity of Yōngam pando; Yong du (Ryū tō) (*Lat. 34° 47' N., Long. 126° 21' E.*), the northern extremity of this island, is a prominent headland 100 feet (30^m5) high. Hōsa do (Kyōsa tō), 185 feet (56^m4) high, lies
- 15 about 4 cables south-westward of Koha do, and is connected to it by a mud bank which dries. Changgu do (Chōkyū tō), 31 feet (9^m4) high, lies between Koha do and Hōsa do. The area between Talli do and Changja do, westward, and Koha do and Hōsa do, eastward, is largely occupied by extensive shoals, with considerable areas of less than 3
- 20 fathoms (5^m5) and a least depth of 3 feet (0^m9) about three-quarters of a mile south-westward of Yong du. There are deep channels, with a minimum width of about 2 cables, both westward and eastward of these shoals. The area between these shoals and Talli do is known as Talli pakchi (Tatsuri hakuchi).
- 25 A red conical light-buoy, exhibiting a *white occulting* light *every six seconds*, is moored off the northern end of the above shoals between Changja do and Koha do and about 3 cables north-westward of Yong du.

- A drying flat extends about half a mile westward from the coast of
- 30 Muan pando in the vicinity of Sō gak (Sei kaku), a point lying about one mile north-north-eastward of Yong du.

A shoal, with a least depth of 29 feet (8^m8) over it, lies in mid-channel eastward of Yong du.

- Light.**—Mokp'o-gu light is exhibited, at an elevation of 106 feet
- 35 (32^m3), from a white circular concrete tower, 24 feet (7^m3) in height, situated on the northern extremity of Hwawōn pando.

Chart 1558, plan of Mokuho kō, Charts 3392, 3393.

- Haenam gang and Hwawon gang.**—**Islands and rocks.**—Haenam gang (Kainan kō) flows along the southern side of Yōngam pando.
- 40 Kaji do (Kashi tō), 422 feet (128^m6) high, and Hwangsang do (Kosan tō), 287 feet (87^m5) high, lie off the south-western corner of Yōngam pando, on the northern side of the entrance to the river. Kaji do (*Lat. 34° 44' N., Long. 126° 22' E.*) lies close south-eastward of Hōsa do, and between them is the entrance to a narrow channel leading to
- 45 Mokp'o hang. There are a number of islets and rocks on the flats bordering the eastern side of this channel, including Kuwa do (Kuga tō), Hang do (Kō tō), Chang do (Chō tō), Sōkhwa do (Sekika tō), and Yongnan do (Ryuran tō); the details of these can best be seen from the chart. Eastward of Hwangsang do, the northern side of the river
- 50 is bordered by a drying flat on which a number of rocks are situated, including Mo do (Bō tō), 87 feet (26^m5) high, and Koma do (tō), 130 feet (39^m6) high. Tal to (Tongetsutatsu tō), 149 feet (45^m4) high, Min'ga do (Minka tō), 44 feet (13^m4) high, and Chūng do (Shō tō), 77 feet (23^m5) high, are among several islets and rocks situated on

Chart 1558, plan of Mokuho kō, Charts 3392, 3393.

the flats off the north-western extremity of Haenam pando, on the southern side of the river.

Hwawōn gang (Kagen kō) flows along the eastern side of Hwawōn pando, and between this peninsula and Haenam pando. Song do (Shō tō), 57 feet (17^m₄) high, lies close to the coast of Hwawōn pando, about 2 miles south-eastward of its northern extremity, and Sa do (tō), 120 feet (36^m₆) high, lies about half a mile further south-eastward. Kumho do (Kinko tō), 605 feet (184^m₄) high, lies in the entrance to the river off the western side of the extremity of Haenam pando. Sokkūmdal to (Takintatsu tō), 107 feet (32^m₆) high, is the largest of several rocks on the flats northward of Kumho do. Pigūm do (Hikin tō), 47 feet (14^m₃) high, lies on the western side of the river about one mile above Kumho do (*Lat. 34° 41' N., Long. 126° 21' E.*).

Tidal streams.—The tidal streams in Mokp'o gu are very swift and subject to considerable diurnal inequality. From observations made by day in the autumn, during spring tides, it appears that the stream in this channel turns, and flows westward with the falling tide, as soon as it is high water in Mokp'o hang. During the next hour the rate rises rapidly to 6 knots; two hours later it has reached its maximum rate of fully 10 knots; one hour before low water the rate is 6 knots, and during the next half hour it falls to 2½ or 3 knots. About the time of low water in the harbour the tidal stream in Mokp'o gu turns, without any period of slack water.

The rate of the east-going stream is less than that of the west-going stream. It attains its maximum rate of about 4 knots some two hours after low water; the rate then decreases slightly, but it is still as much as 3 knots one hour before high water, after which it decreases rapidly to one knot.

At night the east-going stream appears to have the same characteristics as the west-going stream during the day, and attains a rate of 10 knots.

In summer, when Yōngsan gang is in spate, the west-going stream is stated to attain a rate of 13 knots.

Many vessels proceed through Mokp'o gu with the east-going stream, and all avoid meeting the full strength of the west-going stream.

The major portion of the east-going stream that comes in through Mokp'o gu runs south-eastward up Hwawōn gang and Haenam gang; part of it, however, runs northward through the main channel between the western extremity of Yōngam pando and the two islands Hōsa do and Koha do into Mokp'o hang, with a maximum rate of from 2 to 3 knots. Another part sweeps in between Talli do and Hōsa do, where it forms an eddy round the southern of the shoals between these two islands; about 3 hours after low water in Mokp'o hang this eddy spreads out, and the tidal stream at its edges, along the eastern side of Talli do and the western side of Hōsa do, is running at a rate of about 1½ knots. Part of the latter stream runs northward past Koha do, and sweeps round Yong du, at a rate of from 2 to 3 knots, eastward into the harbour.

The west-going stream comes down Yōngsan gang, and part of it turns southward into the narrow channel between the western extremity of Yōngam pando and the islands Koha do and Hōsa do. The main portion strikes Koha do and is deflected northward along this island at a maximum rate of from 3½ to 4 knots; it then sweeps westward,

Charts 3392, 3393, 913, 3365, 104, 3480, 1262, 2347.

Chart 1558, plan of Mokuho kō, Charts 3392, 3393.

at a maximum rate of from 4 to 5 knots, between Yong du and the mudbanks extending westward from Muan pando, whilst a branch of it runs round the northern point of Changja do into Chung gu. Its
 5 main body runs southward along the eastern side of Changja do, at a maximum rate of $3\frac{1}{2}$ knots, and then eddies round the shoals westward of Koha do; the eddy gradually spreads out southward, and the main stream runs south-westward to the southern extremity of Talli do and thence through Mokp'o gu. As a result of the foregoing, there is an
 10 almost constant stream running south-westward along the eastern side of Talli do, and a north-going stream up the western side of Koha do.
Chart 1558, plan of Mokuho kō.

Mokp'o hang.—Harbour limits.—Islands.—Shoal.—Beacons.—
Buoy.—Anchorage.—Mokp'o hang (Mokuho kō) is situated off the
 15 town of Mokp'o (*Lat. 34° 47' N., Long. 126° 23' E.*); it is bounded northward by the south-western promontory of Muan pando, and southward by the north-eastern side of Koha do and the north-western extremity of Yōngam pando; it is a natural ice-free harbour entirely protected from wind and sea. The harbour limits, which
 20 are indicated by pecked lines on the chart, extend from Nam gak (Nan kaku), situated on Muan pando about three-quarters of a mile east-south-eastward of Yong du, to the eastern end of Samhak to (Sankaku tō), described below; the northern ends of the western and eastern limits are each marked by a beacon. It is possible for vessels
 25 of 6,000 tons to enter the harbour, but, owing to the tortuous and narrow channel of access, combined with the strong tidal streams, this is difficult.

Samhak to, 235 feet (71^m6) high, lies on a mud flat close eastward of the town, with an islet, 44 feet (13^m4) high, off its western end; rocks, which dry one foot (0^m3) and 6 feet (1^m8), respectively, lie
 30 within one cable of the islet. The south-western corner of the mud flat is marked by a red conical buoy with a triangular topmark, which is liable to be moved.

Mongha do (Muka tō), 44 feet (13^m4) high, lies on the southern
 35 side of the harbour in the entrance to the passage between Koha do and Yōngam pando. A beacon stands on the eastern side of the entrance to this passage.

A shoal, with a least depth of 27 feet (8^m2) over it, lies near the centre of the harbour about half a mile northward of Mongha do.

40 Vessels anchoring in the stream are advised to keep over towards the northern side of the harbour, off the town of Mokp'o. It is inadvisable to anchor in mid-stream, where the tidal streams combine with the full strength of the river stream; it is also inadvisable to anchor in the area north-north-eastward of Mongha do, as the
 45 tidal streams there are strong and irregular, although there is good anchorage further eastward. Small vessels can anchor in the creek between the north-eastern part of the town and Samhak to, where the depths are over $1\frac{1}{2}$ fathoms over an area fully one cable wide.

Yudal (Yutatsu) san, situated close westward of the town, is a
 50 prominent hill with two peaks, the southern being 743 feet (226^m5) high; its summit is a mass of large rocks of remarkable appearance, and is a good mark for determining the position of Mokp'o from a distance. Pongsu bong (chart 913), situated about $4\frac{1}{2}$ miles north-eastward of Yudal san, is 676 feet (206^m0) high, and has a

Charts 3392, 3393, 913, 3365, 104, 3480, 1262, 2347.

Chart 1558, plan of Mokuho kō.

large pointed rock on its summit. Two tall white chimneys of the power station, situated about 3 cables eastward of Nam gak, are prominent, as also is another chimney situated about $1\frac{1}{4}$ cables north-eastward of the same point. Taea (Daiga) san, situated on the southern side of the harbour and about one mile southward of Samhak to, is a prominent bare peak, 579 feet (176^m5) high. Nearly one mile westward of Taea san a bund has been constructed on the southern shore of the harbour, and there are some prominent oil tanks on it. Pultang (Butsudō) san, 221 feet (67^m4) high, is situated at the western extremity of Yōngam pando.

Light.—A light is exhibited, at an elevation of 68 feet (20^m7), from a white octagonal concrete tower, 20 feet (6^m1) in height, situated on Mongha do (*Lat.* $34^{\circ} 46' N.$, *Long.* $126^{\circ} 23' E.$).

Cable.—Prohibited anchorage.—A submarine telegraph cable crosses the harbour between Samhak to and Yōngam pando; the landing places of the cables are marked by beacons, and anchorage is prohibited on the line joining these beacons. *See* page 37. The northern end of this cable is carried overhead from the northern side of Samhak to to the eastern end of Mokp'o.

Wind and weather.—At Mokp'o hang the prevailing winds are northerly or north-north-westerly in winter, and southerly or south-south-westerly in summer. Gales are usually from directions between north and north-west.

Fogs increase in frequency from April to June, and are most prevalent during the rainy season in July. In August the number decreases sharply, and but little fog is experienced after September.

Tidal streams.—From observations made in the autumn, it appears that the tidal streams in the middle of the harbour, at spring tides, turn about 50 minutes after high water and low water; the time of the turn is, however, considerably affected by the state of Yōngsan gang, and at times it has occurred before high and low water.

South-westward of Samhak to the tidal streams are irregular owing to the water coming out of the channel between this island and the town.

Directions.—Mokp'o gu should be approached from Chongdung hae on an east-south-easterly course, as given in the directions on page 553, so as to avoid the shoals lying about one mile westward of the northern extremity of Hwawōn pando. Directly after passing through Mokp'o gu vessels should turn sharply northward, rounding the south-eastern point of Talli do fairly close to, and keeping the eastern extremities of Pak pi and Ch'ōnch'ūk pi in line, bearing 016° , until northward of the south-western end of the shoal ground eastward. Thence they should proceed along the eastern coast of Changja do until the beacon on Nam gak bears about 115° and is open north-eastward of Yong du, and then turn eastward, passing northward of the light-buoy moored off the northern end of the shoals between Yong du and Changja do; after rounding Yong du, course may be steered for the anchorage, taking care to avoid the bank in mid-channel eastward of Yong du. Deep draught vessels should avoid the 27-foot (8^m2) patch situated about half a mile northward of Mongha do.

During strong southerly and easterly winds there is an eddy in the opposite direction through Mokp'o gu and off Yong du (*Lat.* $34^{\circ} 47'$

Charts 3392, 3393, 913, 3365, 104, 3480, 1262, 2347.

Chart 1558, plan of Mokuho kō.

N., Long. 126° 21' E.), which makes a vessel difficult to handle. About a mile seaward of Mokp'o-gu lighthouse the rate of the tidal streams during spring tides at the middle of the ebb tide is about 9 knots; under these conditions it is dangerous to close the northern extremity of Hwawōn pando before altering course to pass through Mokp'o gu, and it is better to steer for the middle of the entrance when about one mile off. After passing through Mokp'o gu, when this happens about the middle of the flood stream, vessels should not alter course too suddenly when rounding the south-eastern point of Talli do; if the turn is made too sharply the vessel, owing to the check in her speed and the eddy, may not answer her helm when put the other way, and her head may be gradually driven dangerously near the south-eastern extremity of Talli do. In addition the vessel may be carried towards this point by the reverse stream setting south-westward through the channel eastward of Talli do (*see* Tidal streams on page 559).

A vessel making for the harbour during the flood tide will encounter the tidal stream coming through Chung gu when off the southern point of Changja do, and her head may swing to starboard, but it is advisable not to give her any helm to counteract this, as this stream is only felt over a width of about a quarter of a cable, and, as her bows emerge from it the vessel will naturally swing to port. When the ebb tide is running no such precaution is necessary, but at such a time the vessel must take care not to be set on to the light-buoy between Changja do and Yong du, or on to the latter point, when making the turn into the harbour.

With due attention to the tidal streams, the harbour can be entered at night.

Pilotage.—Pilotage is available, but not compulsory. Upon request, by radio or other means, the pilot usually boards at Kasa do when a vessel is approaching through Chongdung hae, the southern channel.

Berthing signals.—The following berthing signals are made from the signal station in the Customs compound, situated in the south-eastern part of the town, for vessels intending to berth at the pontoon in that vicinity:—

	<i>Day signal</i>	<i>Night signal</i>	<i>Signification</i>
The vessel's House flag		A <i>white</i> light below	Berth on the northern
and a yellow cylinder		a <i>red</i> light	side
The vessel's House flag		A <i>red</i> light below a	Berth on the southern
and a red triangle		<i>white</i> light	side
Two red balls		Two <i>red</i> lights, disposed vertically	Berthing not permitted.

The day signals are hoisted at the right yardarm of the flagstaff; in addition to the House flag, the vessel's distinguishing signal in the International Code of Signals may be hoisted at the left yardarm.

Harbour facilities.—Supplies.—Communications.—There are 5 pontoons and 5 small piers; one of the former, 207 feet (63^m1) long, can accommodate a small vessel on each side. Cargo is usually handled in the stream. About 35 lighters and 7 tugs are available.

There are two patent slips, each of about 200 tons capacity. Small repairs can be undertaken.

There are several hospitals, reported to be well equipped.

Charts 3392, 3393, 913, 3365, 104, 3480, 1262, 2347,

Chart 1558, plan of Mokuho kō.

Coal, oil fuel, and Diesel oil are strictly controlled by the Government. Small quantities can be obtained by special arrangement.

Cold storage supplies are plentiful. Water is available alongside or by boat.

Mokp'o is connected to the general railway system. There is frequent communication by sea with Shang-hai, Ta-lien, and Japan. The town is connected to the telegraph and telephone system.

Quarantine.—A quarantine station is maintained at Mokp'o.

Storm signals.—Storm signals are displayed at Mokp'o ; *see* page 28.

Trade.—Under normal conditions, the principal exports are rice, cotton, and edible seaweed ; imports are fertilisers, flour, cotton goods, artificial silk, sugar, cement, coal and timber.

Town.—Mokp'o has the usual modern services and equipment, and is the administrative centre of the province. The population in 1949 was about 100,000.

Climatic table.—*See* Chapter I, page 78.

Chart 913.

COAST.—**Mokp'o to Ch'ulp'o hang.**—**General remarks.**—From Mokp'o the coast trends generally northward for about 50 miles to Ch'ulp'o hang (Chupponeikaye). This stretch of coast is considerably indented, and its southern part is very irregular ; it is fronted by islands and banks to a distance of 10 miles or more for the first 30 miles northward from Mokp'o.

Chart 3392.

Coast.—**Off-lying islands.**—For about 20 miles northward of Mokp'o (Lat. $34^{\circ} 47' N.$, Long. $126^{\circ} 23' E.$) and north-eastward of Myondo sudo (page 555), the coast is fronted by a vast mud bank, which dries ; this bank is intersected by channels, some of which are used by small vessels with local knowledge, and there are numerous islands on it. Imja do and the other islands bordering the northern approach to Mokp'o have been described on pages 553 to 555.

Ch'ang p'o (Sō ho) is a bay filled with drying flats entered about 10 miles northward of Mokp'o, and reached by a narrow channel named Muan gang (Maun kō). Ugwan do (Gyūkan tō) lies close off the north-eastern extremity of Aphae do, which was described on page 556. Maehwa do (Baika tō) and Koi do (Koji tō) are the largest of the islands next north-westward to Aphae do. Hwangma do (Kōba tō) is one of a group of islets lying northward of Maehwa do. Kijōm do (Kiten tō) and Pyōngp'ung do (Byōbū tō) are the largest of the islands between Maehwa do and Chōnjung do, which was described on page 555. Sōn do (Sen tō) is the next large island northward of Koi do, and T'an do (Tan tō) lies about $2\frac{1}{2}$ miles further eastward. T'aei do (Dai tō) and Song do (Shō tō) lie, respectively about one mile and 3 miles north-westward of Sōn do.

Sudo sudo.—**Islands and dangers.**—**Tidal streams.**—Sudo sudo (Suitō suidō), the channel between Imja do (page 554) and the islands eastward and south-eastward, is encumbered with islets and rocks, especially in the southern part, but there are deep passages between them. Saok to (Sagyoku tō), about 400 feet (121^m9) high, and Chi do (tō), 650 feet (198^m1) high, are the largest of the islands bordering the eastern side of Sudo sudo. Su do (Sui tō), in the middle of the channel, has a prominent pointed summit, 565 feet (172^m2) high ;

Charts 3365, 104, 3480, 1262, 2347.

Chart 3392.

a bank, with depths of less than 3 fathoms (5^m5) over it, extends nearly $1\frac{1}{2}$ miles northward from Su do. Vessels can pass either side of Su do, but vessels using the western channel must pass between
 5 a rock, which dries, lying about $1\frac{1}{2}$ miles northward of Su do, and the bank extending northward from that islet. A conical islet, 59 feet (18^m0) high, lies nearly $1\frac{1}{2}$ miles north-north-eastward of Su do, and a rock, which dries, lies about a cable southward of the former. Manji do (Manshi tō), 197 feet (60^m0) high, lies nearly $2\frac{1}{2}$ miles north-
 10 north-eastward of Su do, and Somanji do (Shōmanshi tō), 86 feet (26^m2) high, lies about three-quarters of a mile westward of Manji do ; there is a prominent group of trees on the summit of each of these islets. A rock, which dries 3 feet (0^m9), lies about half a mile northward of Somanji do and about 2 cables off the western shore of Sudo
 15 sudo ; a rock, 6 feet (1^m8) high, lies about a quarter of a mile south-eastward of Sambong dan (Sanhō tan), the north-eastern point of Imja do. Further details can best be seen from the chart.

Oūi do (Ogi tō) is an island lying on the eastern side of the northern entrance of Sudo sudo, and has two hills on it, connected to each other
 20 by lower land ; the western and higher hill is bare and 296 feet (90^m2) high, whilst the eastern is wooded. There is a bay on the southern side of Oūi do, but it dries out entirely. There is no passage between Oūi do and the islands and banks south-eastward.

The tidal streams in Sudo sudo run northward with the rising tide,
 25 and southward with the falling tide, turning at about high water and low water at Anma do (Amma to). On the western side of the channel the north-going stream attains a rate of about 3 knots, and the south-going stream about 4 or 5 knots.

Hamp'yong man.—Islands and dangers.—Tidal streams.—Imsu
 30 pando (Rinsui hantō) is a narrow peninsula, very indented, which extends about 10 miles north-westward from the coast about 15 miles northward of Mokp'o. This peninsula forms the south-western side of Hamp'yōng man (Kanhei wan) ; Tang du (Dō tō) is the northern point of its north-western extremity.

35 The entrance to Hamp'yōng man can be approached by vessels with local knowledge from Sudo sudo or by the channel close along the northern side of Imja do, which is bounded northward by Nagwōl satae (Rakugetsu satai), described on page 565. After passing the northern side of Oūi do the channel leads eastward between mud
 40 banks, which dry, on either side. The entrance to Hamp'yōng man, immediately northward of the north-eastern point of Imsu pando, is obstructed by islets and shoals, the positions of which can best be seen from the chart ; within these there are depths of from 5 to 10 fathoms (9^m1 to 18^m3) for a distance of about 3 miles ; the head of the
 45 bay is shoal, and there are several rocks in it. The shores are fringed by extensive mud banks, which dry, and it should only be entered by small vessels with local knowledge.

Kaūm do (Kaon tō) lies with its southern extremity about 4 miles north-eastward of Tang du (*Lat. $35^{\circ} 09' N.$, Long. $126^{\circ} 15' E.$*) and
 50 on the extensive mud flat which extends from the coast on the northern side of the entrance and continues for about 5 miles south-westward from the western side of this island ; its summit, at the southern end of the island, is a prominent, sharp, rocky peak, 676 feet (206^m0) high. Chō do (Cho tō), situated about half a mile

Charts 913, 104, 3480, 1262, 2347.

Chart 3392.

north-westward of the north-eastern point of Imsu pando and on the southern side of the entrance to Hamp'yŏng man, is an islet 80 feet (24^m4) high, with a prominent clump of trees on its northern side. Kambang san (chart 913), situated at the head of the bay and about 10 miles south-eastward of Chŏ do, is a prominent reddish peak, 842 feet (256^m6) high. 5

The tidal streams in the entrance to Hamp'yŏng man attain a rate of 2½ knots, but they are weak inside the bay.

Islets and banks northward of Imja do.—Up to a distance of about 8 miles north-westward of Sambong dan, the north-eastern point of Imja do, there are a number of sand ridges, some of which dry, running more or less parallel to each other in a north-east and south-west direction; there are several islets on these ridges. All these banks and islets lie on the northern side of the western approach to Hamp'yŏng man. 10 15

Charts 3392, 913.

Kagi satae (Kakuji satai), the outermost bank, lies with its south-western extremity about 3 miles north-westward of the north-western point of Imha do; from this position it extends about 14 miles north-eastward, with general depths of less than 3 fathoms (5^m5) over it, whilst a large portion of it dries. The south-eastern side of this bank is steep-to; a detached shoal, with a depth of 1½ fathoms (3^m2) over it, lies close off the south-western extremity. 20

Several islets lie on the north-western side of Kagi satae. Songi do (Songui to), 556 feet (169^m5) high, the largest of these, lies about 7½ miles northward of Sambong dan, and its northern side is steep-to; there are some dwellings on a shingle spit on its south-eastern side. A rock, which dries 10 feet (3^m0), lies about one mile north-eastward of the northern point of the island. Taeroin do, 179 feet (54^m6) high, is the largest of several islets and rocks lying from 2 to 3 miles eastward of Songi do, the positions of which can best be seen on the chart. 25 30

Kagi do (Kakuji tō), 475 feet (144^m8) high, lies about 2½ miles south-westward of Songi do, and has a clump of trees on its north-eastern end. A precipitous islet, 156 feet (47^m5) high, lies on a sand-bank which extends a short distance from the northern side of Kagi do, and about 3½ cables further northward is a rock 28 feet (8^m5) high. Sogagi do (*Lat.* 35° 15' N., *Long.* 126° 07' E.), 203 feet (61^m8) high, lies about 6 cables north-eastward, and Kakkō do, 347 feet (105^m8) high, lies about half a mile north-westward of Kagi do; both these islands are cliffy. 35 40

Chart 3392.

Nagwŏl satae (Rakugetsu satai) runs parallel to and about 2 miles south-eastward of Kagi satae, and dries over a considerable portion; both sides of this bank are steep-to. About midway between Kagi satae and Nagwŏl satae, there is another bank running in the same direction, which dries only near its western end, where Sangnagwŏl to (Jōrakugetsu tō) and Haragwŏl to (Karakugetsu tō) lie on a mud bank. Sangnagwŏl to is the north-eastern of these two islets, and has two summits each about 320 feet (97^m5) high; there is a shingle beach on its southern side, with some dwellings on a hill behind. Haragwŏl to also has two hills on it, the northern, 368 feet (112^m2) high, which is covered with pine trees, being slightly the higher; 45 50

Charts 104, 3480, 1262, 2347.

Chart 3392.

there are some dwellings on a shingle beach on its eastern side. A rock, 6 feet (1^m8) high, lies about 3 cables westward of Haragwŏl to. Vessels bound for Hamp'yŏng man from westward pass between
 5 the south-western extremity of Nagwŏl satae and the bank, on which are several rocky islets, extending from the north-western side of Imja do.

Another bank runs parallel to and about one mile south-eastward of Nagwŏl satae, from a position about half a mile northward of
 10 Sambong dan, and joins the coastal bank westward of Kaŭm do. On this bank is a chain of four islets. Kogae do (Kokai tō), the south-western of these islets, is 102 feet (31^m1) high and lies about 2 miles north-eastward of Sambong dan. Taegakssi do (Daikakushi tō), 276 feet (84^m1) high, is the south-western and largest of the
 15 two middle islets which lie near the edge of the coastal bank and are covered with grass; the north-eastern islet, which is flat-topped, cultivated, and 95 feet (29^m0) high, lies on the edge of the drying part of the coastal bank which extends south-westward from Kaŭm do, and on which there are a few other islets or rocks above water.

Chart 913.

Off-lying islands and dangers.—Anchorage.—Anma kundo (Amma group) consists of seven islets, the largest of which, named Anma do (Amma to), lies about 5½ miles north-westward of Songi do; the
 25 coasts of most of these islets are cliffy, with a few sandy beaches. There are three villages in the group. A prominent clump of pine trees stands on the northern side of the summit of Anma do, which is 579 feet (176^m5) high (*Lat.* 35° 20' N., *Long.* 126° 02' E.).

Chuk to lies close off the north-western point of Anma do and is connected to it by a rocky ledge; it has two peaks, the eastern being
 30 251 feet (76^m5) high, and there is a group of pine trees on the western. O do, 287 feet (87^m5) high, lies close off the south-western point of Anma do, and Hang do, 250 feet (76^m2) high, lies close south-westward of the former; a rock, awash at high water, lies off the southern extremity of Hang do. Hoeng do, 303 feet (92^m6) high, lies
 35 close off the north-western point of O do.

Ammado myoji (Ammato anchorage) is enclosed by the western side of Anma do, and by Chuk to, Hoeng do, and O do; it is sheltered from all winds except those from between north-north-west and west-south-west. There are no dangers, except a rock, which dries
 40 2 feet (0^m6), lying close off the northern side of Hoeng do and on the southern of the entrance. The anchorage is in a depth of 5½ fathoms (9^m6), mud, with the eastern peak on Chuk to bearing 000°, distant 9 cables. The inner part of the anchorage is divided into two bays by a promontory on the western coast of Anma do, and small vessels
 45 with local knowledge can anchor in either of them.

Sŏngman do, 408 feet (124^m4) high, lies about one mile north-eastward of the northern extremity of Anma do, and is cliffy on its northern side, while its southern side consists of cliffs and shingle beaches. Sosŏngman do, 221 feet (67^m4) high, lies close south-east-
 50 ward of Sŏngman do, with shoal water between, and there is a somewhat prominent group of pine trees on its summit; a rock, 64 feet (19^m5) high, lies close southward of Sosŏngman do. The channel between Anma do and these two islets has depths of from 4 to 8 fathoms (7^m3 to 14^m6), but two rocks, 60 feet (18^m3) and 50 feet

Chart 913.

(15^m2) high, respectively, lie in the north-western entrance, and a rock, which dries 16 feet (4^m9), lies in the middle of the south-eastern entrance.

Chuyō ye (*Lat. 35° 23' N., Long. 126° 05' E.*), a rock 45 feet (13^m7) high, and Ugak sō, 49 feet (14^m9) high, lie about 1½ and 2 miles, respectively, north-eastward of Sōngman do, and between these two rocks is a smaller rock, 5 feet (1^m5) high. Taeyuk to, 112 feet (34^m1) high, is a rocky islet of a reddish colour lying about 3½ miles eastward of Sōngman do, and Wangdūng yō 129 feet (39^m3) high, lies about half a mile southward of Taeyuk to and is connected to it by a reef; a rock, about one foot (0^m3) high, lies about three-quarters of a mile eastward of Wangdūng yō.

Tidal streams.—In the vicinity of Anma kundo the tidal streams set north-eastward with the rising tide, with a maximum rate of from one to 2½ knots, and south-westward with the falling tide, with a maximum rate of from one to 3½ knots; there is slack water for about 10 minutes at approximately the times of high and low water at Anma do; i.e. at about 5 hours after and one hour before the time of high water at Yangtze approaches (Admiralty Tide Tables Standard Port).

The tidal streams are weak in the channel between Anma do and Sōngman do, and strong outside the latter and along the south-eastern coast of Anma do. Near the western ends of Hoeng do and Chuk to the tidal streams are somewhat stronger, a rate of from 2 to 2½ knots having been experienced.

Coast.—Islets and dangers.—For about 3 miles northward of Kaūm do (page 564) there is a low stretch of land, but it then rises abruptly to peaks of over 1,000 feet (304^m8). An islet, 59 feet (18^m0) high, lies close to the coast about 5½ miles north-eastward of the northern extremity of Kaūm do; mud flats, which dry, extend about 3 miles offshore between the northern side of the entrance to Hamp'yōng man and this islet. A rock which dries 11 feet (3^m4), lies close off the edge of these flats and about 2 miles west-north-westward of the northern point of Kaūm do, and another, which dries 10 feet (3^m0), lies about 1½ miles west-south-westward of the 59-foot (18^m0) high islet.

Ch'īlsan do (Chirusan) consists of several rocky islets lying on the edge of the coastal bank about 5 miles westward of the 59-foot (18^m0) islet; they are all covered with grass, and are from 67 to 119 feet (20^m4 to 36^m3) high. Rocks, 68 and 57 feet (20^m7 and 17^m4) high, lie, respectively, about 3 and 4½ miles south-westward of the northern islet of Ch'īlsan do. Vessels should never attempt to pass along the coast southward of the line joining the northern point of Sōngi do and the northern islet of Ch'īlsan do.

Popsōngp'o hang.—Islets and rock.—About 2½ miles northward of the 59-foot (18^m0) islet is the entrance to a creek, which divides into two branches about 1½ miles up. Myo do, an islet 116 feet (35^m4) high, lies in the middle of the entrance; Toūmsō do, 258 feet (78^m6) high, lies on the southern side of the entrance, and Sō do, a rock 44 feet (13^m4) high, on the northern side.

The north-eastern branch of the creek is very shallow, and dries across its entrance. The south-eastern branch is named Pōpsōngp'o hang, and dries except for a narrow channel about half a cable wide;

Chart 913.

it is used by small local craft. There is a small village on the southern side of the entrance to Pöpsöngp'o hang, and Pöpsöngp'o (Popusompu) is a large village on the northern side of the harbour.

- 6 Toũmso do (*Lat. 35° 22' N., Long. 126° 24' E.*) has a somewhat pointed summit and is easily identified by vessels making for the harbour; Kũmjöng san, a sharp, wooded peak, 922 feet (281^m0) high, situated on the northern side of the creek, is a prominent mark, and Chinyang san, situated at the head of Pöpsöngp'o hang and 784 feet (239^m0) high, can be seen from the entrance. Vessels bound for Pöpsöngp'o hang can pass northward of Myo do, or between this islet and Toũmso do; the latter islet lies on the edge of a bank, which dries, extending from the southern side of the entrance.

- 15 **Light.**—A light is exhibited, at an elevation of 236 feet (71^m9), from a structure 23 feet (7^m0) in height, on the northern side of the creek, about one mile eastward of Toũmso do.

Storm signals.—Storm signals are displayed at Pöpsöngp'o; see page 28.

- Coast.—Rocks.**—From Toũmso do the coast trends generally north-north-eastward for about 10 miles to the southern entrance point to Ch'ulp'o hang (Chupponeikaye), which is described below. A rock, 114 feet (34^m7) high, lies off the entrance to a creek about 3½ miles north-north-eastward of Toũmso do, and a rock, 38 feet (11^m6) high, lies about half a mile offshore about 1½ miles further in the same direction; a rock, which dries 15 feet (4^m6) lies about half a mile offshore about 4 miles north-north-eastward of the latter.

Off-lying dangers.—In 1919, the *Shinshei maru* reported a shoal, with a depth of less than 6 feet (1^m8) over it, about 3 miles north-westward of Toũmso do.

- 30 A shoal, with a depth of 4½ fathoms (8^m7) over it, lies about 7 miles north-westward of Toũmso do; the bottom is sand and mud, and there is frequently a heavy ground swell in this vicinity; shoals, each with a depth of 5 fathoms (9^m1) over it, lie about 3 miles south-westward and north-eastward, respectively, of the above shoal.
- 35 **Ch'ulp'o hang.—Islets and dangers.**—Ch'ulp'o hang (Chupponeikaye) is an inlet of which the southern entrance point has previously been mentioned; the entire inlet dries, except for a channel about half a mile wide, with depths of from 2 to 3 fathoms (3^m7 to 5^m5), along its northern side. A bar, with depths of from 4 feet (1^m2) to 40 3 fathoms (5^m5) lies off the entrance to the inlet; just within the entrance is a deep hole, about 1½ miles in length, with depths of 7 fathoms (12^m8).

- Chuk to (Tei somu) is an islet, 102 feet (31^m1) high, covered with grass, lying about one mile northward of the southern entrance point
- 45 of Ch'ulp'o hang, and another islet lies about 2 cables southward of it; these two islets lie on the western edge of the broad sandbank extending from the southern side of the inlet. A rock, which dries 3 feet (0^m9), lies about 2 cables westward of Chuk to (*Lat. 35° 32' N., Long. 126° 29' E.*), and another, which dries 15 feet (4^m6), lies
- 50 about 2 miles north-eastward of the same islet. Miyō do, an islet 61 feet (18^m6) high, covered with grass, lies about 1½ miles westward of Chuk to and on the western edge of the bar; it is surrounded by reefs, and a rock, 16 feet (4^m9) high, lies about 2 cables westward of it, whilst a rock, which dries 12 feet (3^m7) lies about 3 cables south-

Chart 913.

ward of the islet. Kyŏn do (Soragu somu), an islet, 69 feet (21^m0) high, covered with grass, lies close off the northern entrance point of Ch'ulp'o hang.

The channel inside the inlet is marked by fishing stakes on both sides. An islet 73 feet (22^m2) high, lies on the flat on the southern side and about 5½ miles east-north-eastward of Chuk to ; a rock, 19 feet (5^m8) high, lies about 3 cables northward of this islet, and another rock, 7 feet (2^m1) high, lies about three-quarters of a mile north-eastward of the same islet. Ungyŏn do, an islet 73 feet (22^m2) high, lies on the northern side of the channel and about 7 miles east-north-eastward of Chuk to ; about a quarter of a mile south-eastward of this islet, and on the southern side of the channel, is a rock which dries 16 feet (4^m9). Sap'o-ri (Yoguto) and Ch'ulp'o-ri (Chuppo) are two villages at the head of the inlet, but they can only be reached by boats at high water.

The rugged summit of Tusung san, 1,442 feet (439^m5) high, situated about 16 miles east-north-eastward of Chuk to, is prominent ; a peak, 1,115 feet (339^m8) high, situated about half a mile southward of this summit, in line with the 7-foot (2^m1) high rock previously mentioned. bearing about 084°, leads up the channel of Ch'ulp'o hang. On the southern side of the inlet are two peaks of the same elevation, 1,450 feet (442^m0) ; the western is called Chŏngsu san, and the eastern Soyo bong.

Charts 3480, 1262, 2347.

CHAPTER XI.

THE SOUTHERN PART OF THE WESTERN COAST OF KOREA FROM
CH'ULP'O HANG TO INCH'ŌN.*Chart 913.*

COAST.—Islets and rocks.—The coast between Kyōn do (*Lat.* 35° 36' N., *Long.* 126° 28' E.) and Susōngdang, a salient, grass-covered point situated about 2 miles northward, is rocky; there is a small village about midway between these two points, and boats can land here in calm weather. A rock, which dries 2 feet (0^m6), lies about half a mile westward of Susōngdang. Sōk to, an islet 66 feet (20^m1) high, lies 2½ miles northward of Susōngdang, and Sodang do, 106 feet (32^m3) high, lies about a quarter of a mile south-westward of Sōk to; there are numerous rocks between these two islets and Susōngdang. Ūsang bong (Puan san) 1,660 feet (506^m0) high, situated about 7 miles north-eastward of Susōngdang, is the highest peak in this neighbourhood, and is prominent.

The coast between Susōngdang and the entrance to Kunsan hang (ko), situated about 20 miles north-north-eastward, is indented by two large inlets, named, respectively, Tongjin p'onaē (Tonshin-kayeanu) and Chōnyu p'onaē (Chonujukayeanu), and fronted by extensive drying flats. Pian do (to) lies about 5½ miles northward of Susōngdang and on the outer edge of the coastal bank; it has three peaks, the northern and highest of which is 622 feet (189^m6) high. There are shingle beaches on the eastern and western sides of the island, but elsewhere the coasts consist of rocky cliffs; there is a village on the eastern side. Four islets lie close off the eastern side of Pian do.

Two rocks, 90 and 74 feet (27^m4 and 22^m6) high, respectively, lie nearly midway between Pian do and the mainland eastward.

Kyehwa do (Keifua to), 810 feet (246^m9) high, lies about 1½ miles offshore about 9 miles east-north-eastward of Pian do.

Light.—A light, for the use of aircraft, is exhibited from a position about 8 miles northward of Kyehwa do (*Lat.* 35° 47' N., *Long.* 126° 38' E.).

OFF-LYING ISLANDS AND DANGERS.—Wi do (Ui to) is a hilly island lying with its north-eastern extremity about 7½ miles westward of Kyōn do; the summit of the island is a prominent blunt peak, 831 feet (253^m3) high, situated in the north-eastern part. A sand-bank, which dries, extends from 3 to 6 cables from the south-eastern coast, and Taeoech'i do, a wooded islet 125 feet (38^m1) high, lies

Chart 913.

near the northern end of its outer edge. Several islets and rocks lie within a distance of one mile from the south-western side of Wi do. The north-western coast of the island is indented by several bays. In the middle of the north-eastern of these is Chönggūm do, an islet 191 feet (58^m2) high, with another islet close northward of it ; within these islets the bay is entirely occupied by a sandbank which dries. Chin-ni is a village at the head of the bay. Sik (Shiki) to, 379 feet (115^m4) high, lies off the entrance to this bay, and consists of two hills connected by a low neck ; except for the western part of the northern coast, this island is surrounded by reefs and rocks up to a distance of 2 cables. Small vessels with local knowledge can obtain anchorage between Chönggūm do and Sik to, where there is a small area with depths of from 7 to 8 fathoms (12^m8 to 14^m6).

The passage between Wi do and the mainland should not be used except by small vessels with local knowledge ; the depths are less than 5 fathoms (9^m1), and there are several islets and rocks, the positions of which can best be seen from the chart. Among these are Taehyöngje do, 200 feet (61^m0) high, situated about 4 miles eastward of Sökku mi, the southern extremity of Wi do ; Changūn sō, which dries 20 feet (6^m1), about 6½ miles eastward of Sökku mi ; and Imsu do, 138 feet (42^m1) high, about 2½ miles north-westward of Changūn sō.

Beijamunyo (*Lat. 35° 36' N, Long. 126° 14' E.*) situated about one mile north-westward of the western point of Wi do, consists of three rocks close together, which dry 19 feet (5^m8). Kaarumuruyo lies about one mile north-eastward of Beijamunyo, and consists of two rocks which dry 8 feet (2^m4).

Hawangdūng do (Teiwantsun) lies about 7 miles westward of Sik to and has two peaks, the western and higher of which is 668 feet (203^m6) high and wooded ; the coast consists of rocky cliffs, but in calm weather landing can be effected in a small bay on the southern side, and also on the northern side of the island. Sangwangdūng do (Sowantsun), 546 feet (166^m4) high, is separated from the northern side of Hawangdūng do by a deep channel about 6 cables wide. Both these islands are inhabited and are cultivated in parts. Mop'i do, a rocky islet 208 feet (63^m4) high, covered with grass, lies nearly half a mile eastward of the northern point of Sangwangdūng do, and close northward of Mop'i do is Puk am, a similar islet, 98 feet (29^m9) high, with a rock above water off its eastern side. Yöl to (Observation islet) lies about three-quarters of a mile eastward of Mop'i do, and is a round-topped islet, 106 feet (32^m3) high, covered with grass. There are deep channels between Yöl to and the other two islets, and between the latter and Sangwangdūng do.

A bank, with depths of from 8 to 10 fathoms (14^m6 to 18^m3) over it, lies about 5 miles south-westward of Hawangdūng do.

Kogunsan kundo.—Kogunsan kundo (Kokunsan islands) comprises several islands lying in two chains, separated by a channel about one mile wide running in an east and west direction ; Munyō do (Mokami to), the southernmost island of the group, lies about 3 miles north-north-westward of Pian do (*Lat. 35° 45' N., Long. 126° 27' E.*). All the islands have more or less bare and precipitous hills on them.

Yami do, the easternmost island of the southern chain, lies about 6 miles north-north-eastward of Pian do, and has a prominent

Chart 913.

rounded summit 508 feet (154^m8) high ; there is a wood on the southern slope of this hill, and a village below it. Soyami do, 213 feet (64^m9) high, lies close westward of Yami do, and there are a few pine trees on the southern side of its summit, which is situated in the eastern part ; the western part is a low flat-topped hill covered with grass. A rock, 33 feet (10^m1) high, lies about one cable westward of the western extremity of Soyami do, and about half a cable south-westward of this rock is a small rock 2 feet (0^m6) high.

10 Sinsi do (Unkoru) lies with its eastern extremity nearly 1½ miles southward of Yami do ; it is the largest island of the southern chain and is indented by many bays. This island is nearly divided into two parts, the connection being a narrow strip of shingle ; the bay on the southern side of this shingle strip, like the others, is entirely
15 filled by a bank of sand and mud, which dries. The eastern part of the island has two peaks of almost the same elevation, the southern, 642 feet (195^m7) high, being slightly the higher of the two ; the summit of the western part is a prominent sharp peak, 613 feet (186^m8) high.

Munyō do (Mokami to) lies close south-westward of Sinsi do and
20 has a few trees on it. The summit of the island is situated in the south-western part and is 424 feet (129^m2) high ; it is prominent from westward. A mud flat, which dries, and on which are several rocky islets, extends some distance from the northern side of the island. There is a deep gully, fully half a mile broad, along the
25 southern side of Sinsi do and Munyō do.

Sōnyu do (Muin to) lies close north-westward of Munyō do and consists of two parts connected by a narrow strip of sand about half a mile in length. The summit of the southern part is a bare, rocky peak 359 feet (109^m4) high ; the two principal villages of the group,
30 are situated in this part. The summit of the northern part is 489 feet (149^m0) high ; the western extremity of this part is a thickly wooded, isolated hill, and a rock, 20 feet (6^m1) high, lies about one cable westward of it. The bays on either side of the sandy strip connecting the two parts of Sōnyu do are occupied by flats which dry.

35 Changja do lies close westward of the southern part of Sōnyu do and is 115 feet (35^m0) high. Taechang do lies close northward of Changja do and is connected to it by a reef which dries ; its summit is a bare, rocky peak 452 feet (137^m8) high. Foul ground extends about 3 cables westward from these two islands.

40 All the islands just described lie at the south-western end of a tongue of the coastal bank which extends from the mainland north-eastward.

Kwanji do (Kochi tō), the westernmost island of the southern chain, is separated from Changja do and Taechang do by a channel about 3
45 cables wide between the banks extending from either side ; its summit, near the centre of the island, is 443 feet (135^m0) high, and the northern extremity of the island is a prominent wooded peak, 223 feet (68^m0) high. The western coast is precipitous and steep-to. The channel eastward of Kwanji do has a least depth of 7 fathoms
50 (12^m8) in the fairway ; Koru sō, a rock which dries 9 feet (2^m7), lies in the middle of the northern entrance, and vessels should pass eastward of it. A rock, 19 feet (5^m8) high, lies about a quarter of a mile northward of the northern extremity of Kwanji do.

Kye do (Lat. 35° 51' N., 126° 27' E.), situated at the eastern end of

Chart 913.

the northern chain of Kogunsan kundo, lies about $1\frac{1}{2}$ miles west-north-westward of Soyami do and is a rocky islet, 105 feet (32^m0) high, covered with grass. A reef extends from one to 2 cables from its eastern and southern sides, and a rock, which dries 21 feet (6^m4), lies on the eastern part of this reef. 5

Hoenggyōng do (Pikkyon) lies with its eastern extremity nearly three-quarters of a mile west-north-westward of Kye do; its summit, situated near the eastern end, is 269 feet (82^m0) high. A reef extends about half a mile south-eastward from the eastern extremity of Hoenggyōng do, leaving only a narrow boat passage between its outer end and Kye do. Sohoenggyōng do, 250 feet (76^m2) high, lies close westward of Hoenggyōng do, and there is no passage between. 10

Pangch'uk (Panjiku) to, which has a peaked summit, lies westward of Sohoenggyōng do, and is separated from it by a passage about 2 cables wide, with a least depth of 19 fathoms (34^m7) in the fairway; this passage is navigable for vessels with local knowledge, but the tidal streams may attain a rate of 3 knots and there are tide rips. The western extremity of Pangch'uk to is known as Kwangdae do, but it is in reality a peninsular connected to the main island by a narrow neck of land. 15 20

Myōng do (Porugunnurii to), 358 feet (109^m1) high, which also has a peaked summit, lies close westward of Kwangdae do and is connected to it by a ledge which dries. A small rock, 10 feet (3^m0) high, lies close off the north-eastern point of Myōng do, and a $1\frac{1}{2}$ fathom (2^m3) patch lies about a quarter of a mile south-eastward of this rock. Sorupun sō, (yo) a rocky ledge which dries 17 feet (5^m2), lies about half a mile northward of the north-eastern point of Myōng do, and there is foul ground for about a quarter of a mile around it. Myōng do, as well as the islands in the northern chain eastward of it, is clifty, devoid of trees, and uninhabited. 25 30

Ponong do, 262 feet (79^m9) high, lies about 2 cables westward of Myōng do, and is a wooded islet with clifty coasts. There is a least depth of $3\frac{1}{2}$ fathoms (6^m4) in the channel between Ponong do and Myōng do. 35

Mal (Taruno) to, 370 feet (112^m8) high, the westernmost island of the group, is separated from Ponong do by a narrow passage only suitable for boats. A rocky ledge, with two islets on it, extends about a quarter of a mile southward from the western point of the island. A village, with a clump of trees on either side, is situated at the head of a small bay on the southern coast of Mal to. 40

A 10-fathom (18^m3) patch lies about one mile westward of Mal to.

Light.—Storm signals.—A light is exhibited, at an elevation of 177 feet (53^m9), from a white octagonal concrete tower on a dwelling, 35 feet (10^m7) in height, situated on the western extremity of Mal to. 45

Storm signals are displayed from the lighthouse; see page 28.

Anchorage.—Tidal streams.—Anchorage, sheltered except from westerly winds, can be obtained in the channel between the northern and southern groups of Kogunsan kundo. The western entrance is free from dangers, but the eastern entrance is too shoal to be used except by small vessels. The best positions for anchoring are about 4 cables southward of the western end of Hoenggyōng do, and about the same distance off the middle of the southern side of this island; the depths here are about 8 fathoms (14^m6). 50

Chart 913.

The tidal streams in this channel run eastward with the rising tide, and westward with the falling tide, the maximum rate being from one to $2\frac{1}{2}$ knots. Outside the group the tidal streams set northward and southward.

Outlying islets and shoals.—A 9-fathom (16^m5) patch and an 8-fathom (14^m6) patch lie, respectively, about $2\frac{1}{2}$ miles north-westward and 6 miles south-westward of Mal to.

Hük to (Komu somu), 184 feet (56^m1) high, lies about 7 miles westward of Mal to, and is a bare islet with a pointed summit; a rock above water lies close off its western side. A 10-fathom (18^m3) patch lies about 2 miles eastward of this islet.

Chik (Chiku) to, 230 feet (70^m1) high, lies about $4\frac{1}{2}$ miles west-north-westward of Hük to, and is a precipitous rocky islet with a sharp summit; Piyyomu (*Lat. $35^\circ 53' N.$, $Long. 126^\circ 04' E.$*), a bare rock 157 feet (47^m6) high, lies about 2 cables westward of Chik to, with a rock, which dries, between them. Buoys with red flags, used by fishermen, are stated to be found southward of Chik to and Hük to.

Sibidongp'a do (Yorutsudompa to) is a group of about a dozen uninhabited islets, the highest of which is 283 feet (86^m3) high, and lies about 8 miles north-westward of Mal to. These islets, except the southernmost, lie on a horseshoe-shaped reef, forming a bay open northward, in which there is a depth of 8 fathoms (14^m6).

KUNSAN HANG.—**General remarks.**—Kunsan hang (ko) is the anchorage off the city of Kunsan, which is situated on the southern side of the mouth of Küm gang (Kunsan ko) and about 14 miles north-eastward of Yami do (page 571). The port is of considerable importance as an outlet for Korean produce.

The anchorage is well sheltered from wind and sea, but, owing to the silt brought down by Küm gang, the depths in it and in the approach channel are continually changing, especially when the river is in spate, and it is advisable to employ a pilot. The harbour can only be reached by small vessels, but larger vessels can anchor in the entrance channel within about 3 miles of Kunsan, and work cargo from lighters. A large sandbank, which dries and on which there are several islets, lies off the entrance to Küm gang; the channel southward of this bank is the one generally used by shipping, and it is buoyed and lighted.

Southern channel.—**Islets and landmarks.**—Piüng do (Piun to) is the outermost island on the southern side of the main channel leading to Kunsan hang; it lies about 6 miles north-north-eastward of Yami do and close off the edge of the drying portion of the coastal bank which forms the southern side of that channel. Piüng do is 219 feet (66^m7) high, brown-coloured and prominent; a small village stands on its eastern part. Mo do, a rocky islet, 30 feet (9^m1) high and covered with grass, lies about 4 cables eastward of Piüng do (*Lat. $35^\circ 57' N.$ $Long. 126^\circ 32' E.$*).

Myöng am (Baruku nyo) is a group of two large and several small rocks lying off the western end of the large bank, which dries, separating the northern and southern channels; the largest rock, 28 feet (8^m5) high, lies at the eastern end of the group and about 2 miles northward of Piüng do. A shoal, with depths of less than one fathom (1^m8) over it, extends about 2 miles south-westward from Myöng

Chart 913.

am ; the southern channel is entered between this shoal and Piŭng do.

Osik (Youjiku) to, situated nearly $1\frac{1}{4}$ miles north-eastward of Piŭng do, lies on the edge of the flat which forms the southern side of the southern channel ; it has a brown-coloured hill, 239 feet (72^m8) high, at its western end, and there are two groups of pine trees on the western side of this summit ; there is another hill, 118 feet (36^m0) high, with a prominent clump of trees on its summit, at the eastern end of the island, and there is a village on the northern side of this hill. Ka do, 110 feet (33^m5) high, and Ga do, 149 feet (45^m4) high, lie about half a mile southward of Osik to. Naech'o do (Sei somu), 177 feet (53^m9) high, lies about half a mile south-eastward of Osik to, and there is a small village on it. There is a narrow, shallow boat passage through the coastal bank between Naech'o do and Ga do. Changsan do, 83 feet (25^m3) high, lies about $1\frac{1}{4}$ miles north-north-eastward of Naech'o do and on the edge of the coastal bank which forms the southern side of the southern channel. Kanae do consists of two islets almost joined together ; the southern lies about half a mile south-eastward of Changsan do and is 74 feet (22^m6) high, with a single tree on its summit.

Yubu do (Iubu somu), 73 feet (22^m3) high, lies about one mile north-north-westward of Changsan do, on the bank separating the northern and southern channels. Hŭg am, 39 feet (11^m9) high, lies about one mile westward of Yubu do. Taejuk to, 110 feet (33^m5) high, and Sojuk to lie close together about $1\frac{1}{4}$ miles north-eastward of Yubu do, and are the largest of several rocks in the vicinity.

Pari do, 59 feet (18^m0) high, lies about $1\frac{1}{4}$ miles eastward of Changsan do, and has a large tree, encircled by bamboos, on its summit.

Ponghwa ryŏng, a sharp peak 443 feet (135^m0) high, is situated on the coast about 4 miles eastward of Changsan do ; it is the highest hill in this locality and is easily identified. Chŏnmang san (*Lat. $36^{\circ} 00' N.$, Long. $126^{\circ} 40' E.$*), the rocky northern entrance point to Kunsan hang, is situated about 2 miles north-westward of Ponghwa ryŏng and is 311 feet (94^m8) high ; there is a large white chimney on its summit. A sharp, rocky peak, 236 feet (71^m9) high, is situated about half a mile north-eastward of Ponghwa ryŏng.

Dangers.—Lights and buoyage.—No 1 light-buoy, painted black, exhibiting a *white flashing light every three seconds*, is moored about one mile westward of Piŭng do. This buoy is liable to drift, and some time may elapse before it is replaced in position.

A light is exhibited, at an elevation of 36 feet (11^m0), from a red circular stone tower 46 feet (14^m0) in height, situated on a rock, which dries 9 feet (2^m7), lying nearly half a mile westward of the north-western point of Osik to ; between this rock and the island is a rock which dries 22 feet (6^m7).

No. 2 light-buoy, painted red, exhibiting a *white flashing light every three seconds*, is moored on the southern side of the fairway about 7 cables north-eastward of the north-western point of Osik to ; it marks a turning point in the fairway.

Two drying patches lie about one cable northward of the fairway about half a mile eastward of No. 2 light-buoy.

On the southern side of the fairway, and north-eastward of Osik to, is a detached bank, which dries over a length of about one mile in an east and west direction.

Chart 913.

A light is exhibited, at an elevation of 33 feet (10^m1), from a red conical stone structure, 48 feet (14^m6) in height, situated on a rock which dries 14 feet (4^m3), lying about 2 cables north-westward of Changsan do ; there is foul ground between this rock and Changsan do (*Lat.* 35° 58' N., *Long.* 126° 37' E.). A rock, which dries one foot (0^m3), lies about 6 cables east-north-eastward of Changsan do and on the southern side of the fairway ; a patch which dries 9 feet (2^m7), lies about 2 cables northward of the fairway opposite this rock.

A light is exhibited, at an elevation of 26 feet (7^m9), from a red circular stone tower, 39 feet (11^m9) in height, situated on a rock on the southern side of the fairway about 4 cables north-north-westward of Pari do.

Between Pari do and Chõnmang san, the channel is obstructed by a bar with a least depth of one fathom (1^m8).

A light is exhibited, at an elevation of 37 feet (11^m3), from a black circular concrete tower, 51 feet (15^m5) in height, situated on a rock on the northern side of the fairway lying about 3 cables south-eastward of Chõnmang san.

Above Chõnmang san the fairway is close to the northern shore for about 1½ miles, and then crosses over to the southern shore.

Northern channel.—Islets and dangers.—Chuk (Chiku) to, 137 feet (41^m8) high, lies about 5 miles northward of Piung do and on the northern side of the entrance to the northern channel ; a reef, which dries, extends about 3 cables south-westward from the western extremity of Chuk to, and on the outer end of this reef is Ch'i do, a small islet 88 feet (26^m8) high. Yökkõng, a black rock, 47 feet (14^m3) high, lies about half a mile westward of Chuk to, with foul ground between.

Kaeya do (Kaiya to), 218 feet (66^m4) high, lies about 4 cables eastward of Chuk to, with foul ground between, and has some prominent trees on its summit ; foul ground, on which there are numerous drying patches, extends about 6 cables from its north-western side, and one mile from its north-eastern side, and it is connected to the mainland eastward by a sandbank which partly dries. Pu do, 44 feet (13^m4) high, lies about a quarter of a mile off the north-western corner of Kaeya do. Some rocks, which dry, lie within half a mile southward of Kaeya do. Chang do, 39 feet (11^m9) high, and A do (Boko somu), 70 feet (21^m3) high, are situated, respectively, about one mile and 3½ miles eastward of Kaeya do.

As the northern channel can only be used by small vessels with local knowledge, no further description of it will be given.

Harbour.—Breakwater.—Beacon.—Piers.—Jetty.—The outer harbour limit is a line drawn east-south-eastward from Chõnmang san (*Lat.* 36° 01' N., *Long.* 126° 40' E) to Tang mal, a point on the southern shore at the north-western end of the city of Kunsan. The inner harbour limit is a line drawn about 172° from Soch'i got, a point on the northern shore about 3 miles eastward of Chõnmang san.

A breakwater, about half a mile long, runs parallel to and about one cable from the southern shore, and encloses a harbour for fishing vessels ; its eastern end, on which there is a beacon, lies about a quarter of a mile west-north-westward of Tang mal. There are a number of small piers on the southern shore, and three pontoons are

Chart 913.

situated off Kunsan between Tang mal and Minya am, a rock lying close offshore about three quarters of a mile east-south-eastward.

The town of Changhang, where harbour works are in progress, lies on the northern side of the harbour; two pontoons and some small piers are situated here. A jetty extends about 2 cables south-south-westward from Soch'i got. 5

Drying reefs extend up to about 2 cables offshore on the northern side opposite Tang mal.

Light.—A light is exhibited, at an elevation of 29 feet (8^m8), from a circular concrete structure, 36 feet (11^m0) in height, painted red and black in horizontal bands, situated on Minya am (*Lat.* 35° 59' N., *Long.* 126° 43' E.). 10

Anchorage.—Cautions.—Small vessels can anchor off the city of Kunsan, in an area about 1½ cables wide from half a mile to 1½ miles north-westward of Minya am; the depths are from 3½ to 5 fathoms (5^m9 to 9^m1). Larger vessels can anchor in the eastern end of the entrance channel, northward of Pari do. 15

In 1946 vessels could only enter in daylight and between 3 hours before and 3 hours after high water. 20

If there is a heavy swell it is dangerous for vessels exceeding a draught of 15 feet (4^m6) to attempt to pass through the channel.

Prohibited anchorage.—Cables.—Anchorage is prohibited between a line joining Minya am and Soch'i got and a line drawn 236° from Soch'i got to a position about a quarter of a mile eastward of Tang mal; this does not affect vessels lying alongside the pontoons or making fast to the pier. 25

Two submarine telegraph cables cross Kūm hang north-eastward of the city and above the harbour limits. See page 37.

Winds and weather.—The prevailing winds are from between north-east and north-west in winter, and from between south-east and south-west in summer. The winds are generally light, and gales are rare. 30

The handling of cargo is sometimes hindered or interrupted by north-westerly winds, which are most frequent from September to February. There are about 30 days in a year when it is impossible to work cargo in the entrance, and about 10 days when handling is prevented in the harbour. 35

Fog is most prevalent in June and July. It sometimes lasts for several days, but usually occurs near sunrise and clears during the morning. Ice is not a hindrance to navigation. 40

Tidal streams.—Off Osik to slack water at the end of the rising tide occurs about one hour before the time of high water at Inch'ön (Admiralty Tide Tables Standard Port), and at the end of the falling tide about 5½ hours after high water. 45

In Kunsan hang the flood stream slackens about 20 minutes later than off Osik to, and the ebb stream about 30 minutes later than off Osik to. The flood stream attains its maximum rate, 3 knots, about midway between Chōngmang san and Kunsan hang about 4½ hours before the time of high water at Inch'ön; the ebb stream is strongest off the southern side of Yubu do, where it attains a rate of 4 knots about 2½ hours after the time of high water at Inch'ön. 50

In the anchorage off the pontoons at Kunsan hang (*Lat.* 36° 00' N. *Long.* 126° 44' E.) the flood stream runs for 5½ hours, with a maximum

Chart 913.

rate of about $2\frac{1}{2}$ knots, and the ebb stream runs for $6\frac{1}{2}$ hours, with a maximum rate of $3\frac{1}{2}$ knots ; there is slack water for about 15 minutes. For several days after a freshet the ebb stream may run at double
 5 its usual rate, and it then runs for a longer period, whilst the flood stream runs for a correspondingly shorter period.

Pilots.—Pilots are available on early request to the Port Director at Kunsan. Pilotage waters commence off Piŭng do. Vessels are recommended to employ one.

- 10 **Harbour facilities.**—**Supplies.**—**Communications.**—The main berthing facilities at Kunsan consist of three pontoons, each 230 feet (70^m1) long and with a depth of 26 feet (7^m9) alongside. A number of small piers and quays are only used by lighters.

A 30-ton crane is available, and it is reported that there is a 10-ton
 15 floating crane.

Five tugs and about 60 lighters are available.

There is a small patent slip. Repairs to small craft can be undertaken.

A hospital is available.

- 20 Coal and oil fuels are controlled by the Government and small quantities can be obtained by special arrangement.

Fresh provisions are obtainable ; fresh water can be supplied.

Kunsan is connected to the general railway system of Korea.

- 25 There is communication by sea with Shang-hai, Ta-lien, and various ports in Korea and Japan.

Storm signals.—Storm signals are displayed at Kunsan (*Lat. $35^{\circ} 59' N.$, Long. $126^{\circ} 43' E.$*). See page 28.

- Kunsan.**—Kunsan is a city planned on modern lines, and in 1950 had a population of about 80,000 ; it is connected to the general
 30 telegraph system.

Trade.—In normal times, exports include rice, beans, and hides ; imports are rice, flour, salt, tobacco, matches, coal and fertilisers.

Charts 3699, 913.

- COAST.**—**Islands and dangers.**—**Anchorage.**—From Chŏnmang san
 35 the coast trends generally north-westward for about 11 miles to Tongbeakchong gap (Tompekuchon), which is the prominent rocky southern extremity of a small peninsula which forms the northern and western sides of Piin man (Pii-in bay). Ahang do (Amo), 93 feet (28^m3) high, lies about one mile offshore about $4\frac{1}{2}$ miles north-
 40 westward of Chŏnmang san. Between Ahang do and Tongbeakchong gap (*Lat. $36^{\circ} 08' N.$, Long. $126^{\circ} 30' E.$*) the coast is fronted by a bank, with depths of less than 3 fathoms (5^m5) over it, which extends as far as 4 miles offshore, and on which there are several drying patches.

- 45 **Chart 3699.**

Piin man is entered between Tongbeakchong gap and a point lying about $2\frac{1}{2}$ miles eastward, close off which is Mo do, a wooded islet, 129 feet (39^m3) high ; a considerable portion of this bay dries, and the remainder is very shoal. Ssang do (San to) consists of two islets,
 50 123 feet (37^m5) high, lying about $1\frac{1}{2}$ miles eastward of Mo do.

Foul ground extends up to one mile off the western side of the peninsula which terminates southward in Tongbeakchong gap ; details of this can best be seen from the chart. Oryŏk to (Orek),

Charts 3480, 1262, 2347.

Chart 3699.

54 feet (16^m5) high, lies about 4 cables offshore about one mile north-westward of Tongbeakchong gap. Chach'i to, 61 feet (18^m6) high, lies about 1½ miles north-north-eastward of Oryók to. Kwang am, 5 feet (1^m5) high, lies about 4 cables northward of Cach'i to. 5

Yŏn do (to), 582 feet (177^m4) high, lies about 4½ miles south-westward of Tongbeakchong gap and is a useful landmark; its south-eastern extremity is a cultivated plateau. A shoal, with depths of 2½ fathoms (4^m6) over it, extends about half a mile from the eastern side of this island, and there is a small village at the inner end of a wooded promontory which extends from about the middle of this side. Anchorage can be obtained, in depths of from 5 to 6 fathoms (9^m1 to 11^m0), mud, about midway between Yŏn do and Tongbeakchong gap (*Lat.* 36° 08' N., *Long.* 126° 30' E.). 10

Beijaa man (bay) is entered between the north-western extremity 15 of the peninsula terminating southward in Tongbeakchong gap, and a point about 3 miles north-eastward, and practically dries throughout; it has three inner bays, and the southern of these is almost connected with Piin man. U do (Soi somu), 162 feet (49^m4) high, lies near the head of Beijaa man. Sheltered anchorage, except with 20 winds from between south-west and north-west, can be obtained off Beijaa man, in depths of from 5 to 6 fathoms (9^m1 to 11^m0), mud.

The coast between the northern entrance point of Beijaa man and a point about 8 miles northward, on which is a hill 186 feet (56^m7) high, is fringed with sand flats, and rocks, which dry, lie as much as 25 2 miles offshore in places; the positions of these can best be seen from the chart. Hwangjuk (Hanjiki) to, 96 feet (29^m3) high, lies about 1½ miles north-westward of the northern entrance point of Beijaa man, and Chigon do, 94 feet (28^m7) high, lies about half a mile west-south-westward of it. Sokdae do (Sokutei to), 100 feet (30^m5) 30 high, lies about 1½ miles northward of Hwangjuk to. Chuk to, 123 feet (37^m5) high, lies about 2 miles north-north-eastward of Sokdae do. Tasurigihamu and the other dangers lying in the approach to Ch'ŏnsu man (Sajan kaye) are described on page 584. Kabam p'o (Katsupaoi po), situated at the northern end of this stretch of coast, 35 is a large bay filled with flats which dry; in it lies Yul to, an islet 152 feet (46^m3) high. Between Kabam p'o and the entrance to Ch'ŏnsu man, about 4 miles further northward, is another similar bay, named Taech'on hang (Poryon po). Taech'on (Hannei) is a village situated at the head of Taech'on hang. Sŏngju (Poryonsonju) san, situated 40 about 4½ miles east-north-eastward of Taech'on, is a sharp and prominent peak, 2,232 feet (680^m3) high.

Storm signals.—Storm signals are displayed at Taech'on; *see* page 28.

Chart 913.

OUTLYING ISLANDS.—**Ōch'ŏng do.**—**Light.**—**Fog signal.**—**Storm 45 signals.**—Ōch'ŏng do (Ochon to) is a wooded island lying about 21 miles westward of Yŏn do; its coasts are either cliffy or rocky, and are steep-to at a short distance. The summit of the island, 569 feet (173^m4) high, is situated in the western part. Kajin sŏ (Pinnacle 50 rock), 70 feet (21^m3) high, lies about 3 cables south-eastward of the south-eastern point of Ōch'ŏng do and is prominent; there is foul ground for about half a cable off the northern side of this rock.

A light is exhibited, at an elevation of 191 feet (58^m2), from a white

Charts 3480, 1262, 2347.

Chart 913.

circular concrete tower, 52 feet (15^m8) in height, situated on the north-western extremity of Ōch'ōng do (*Lat.* 36° 08' N., *Long.* 125° 58' E.). A fog signal is sounded from the lighthouse.

- 5 Storm signals are displayed at the lighthouse ; see page 28.

Ōch'ōngdo myoji.—**Light.**—Good anchorage, sheltered from all winds except those from between south-south-east and south-south-west, can be obtained in the middle of Ōch'ōngdo myoji (Ochonto anchorage), a bay on the southern side of Ōch'ōng do, in depths of 10 from 6 to 8 fathoms (11^m0 to 14^m6) sand and mud, good holding ground ; rocks extend nearly one cable from the western entrance point of the bay, and a rock, which dries 6 feet (1^m8), lies about a quarter of a cable off the eastern entrance point, otherwise there are no dangers.

- 15 During the summer this bay is a good refuge, as, although it is open to southerly winds, a vessel will ride comfortably ; during the winter, however, strong northerly and north-westerly winds cause eddies and raise a cross sea, which causes a vessel to roll and pitch heavily, and in this season it is advisable to moor. A fishing village is situated 20 in the north-western corner of the bay ; a breakwater extends about one cable east-north-eastward from the shore close southward of the village.

A light is exhibited, at an elevation of 26 feet (7^m9), from a black square iron tower, 23 feet (7^m0) in height, situated on the head of the 25 breakwater.

- Oeyōn yōlto.**—Hwang do (Tsuri somu), 301 feet (91^m7) high, the westernmost island of Oeyōn yōlto (Oiyonu group), lies about 6 miles northward of Ōch'ōng do and is a rocky island devoid of trees. There is a small bay on its north-western side, and a ridge of rocks extends 30 about 8 cables northward from its western entrance point. Pyōn do (Cone islet), situated about 1½ miles north-eastward of Hwang do, is a prominent rocky islet of a light brown colour, 251 feet (76^m5) high and covered with grass ; a rock, with a depth of 3 feet (0^m9) over it, lies about one cable off its north-eastern side, otherwise it is steep-to 35 all round. Hwang do and Pyōn do are separated from the main group of Oeyōn yōlto by a deep channel about 2½ miles broad ; in the southern part of this channel, and about 1½ miles east-south-eastward of Hwang do, is Se ye (Double rock) a steep-to, barren, round topped islet, 96 feet (29^m3) high.

- 40 Hoenggyōn do, the southwestern island of the main group, lies with its north-western extremity about one mile eastward of Se ye ; it has three peaks, the middle and highest being 350 feet (106^m7) high. A rocky promontory extends from the middle of the north-eastern coast, and there is a small village at the head of the northern 45 of the two bays on either side of this promontory. Sōlp'ung sō (Sharp rock), 127 feet (38^m7) high, is a pointed, precipitous islet lying about 6 cables south-westward of the north-western extremity of Hoenggyōn do, and there are some low rocks close off its eastern side. There is a black rock, 17 feet (5^m2) high, lying close off the 50 middle part of the western coast of Hoenggyōn do. A mud flat, which dries, extends about one cable from the western side of the northern end of the island. Foul ground extends nearly 3 cables north-eastward from the northern point of Hoenggyōn do, and terminates in a black rock, 6 feet (1^m8) high. Oehoenggyōn do is an

Charts 3480, 1262, 2347.

Chart 913.

islet 131 feet (39^m9) high, covered with grass, lying close eastward of the south-eastern point of Hoenggyŏn do; a rocky ledge extends about 2 cables south-eastward from this islet.

O do (*Lat.* 36° 12' N., *Long.* 126° 03' E.), the southernmost island 5 of the group, lies about 6 cables south-eastward of Hoenggyŏn do; it is barren and uninhabited, and has two peaks, the southern and higher of the two being 308 feet (93^m9) high. Oeo do, a round-topped islet 112 feet (34^m1) high, lies close off the western point of O do, and Piahang, a peaked islet, 138 feet (42^m1) high, lies close off the northern 10 point. A rock, which dries 17 feet (5^m2), lies about half a cable eastward of the southern point of O do, and a rock, which dries 15 feet (4^m6), lies about 1½ cables south-eastward of this rock, with a deep channel between.

Ch'omang do, situated about 1½ miles eastward of the eastern point 15 of O do, is a black rock 17 feet (5^m2) high. A rock with a depth of 4½ fathoms (8^m2) over it, is charted about 6½ cables northward of Ch'omang do, but its position is doubtful. Muma do, lying about three-quarters of a mile north-westward of Ch'omang do, is a light-brown rock, 96 feet (29^m3) high, with grass on its summit. A flat-topped 20 rock, 29 feet (8^m8) high, lies about 3 cables westward of Muma do, with a clear passage between.

Oeyŏn do (Oiyonu to), the largest island of the group, lies with its south-western extremity about one mile north-eastward of O do; its summit, 776 feet (236^m5) high, is situated in the eastern part, and 25 another peak, 554 feet (168^m9) high, situated on the south-western end of the island, is also prominent. The middle part is low and cultivated, and there is a bay with a sandy beach and a few houses at the head, on the southern coast. Tangsanmu do, a grass-covered islet 193 feet (58^m8) high, lies about one cable off the south-western 30 extremity of Oeyŏn do. Hong sŏ is a bare reddish-brown rock, 28 feet (8^m5) high, lying about 6 cables westward of the western point of Oeyŏn do. Close off the northern extremity of Oeyŏn do are two rocks, the outer one being 88 feet (26^m8) high. Foul ground, terminating in a rock with a depth of 2 fathoms (3^m7) over it, extends 35 about a quarter of a mile south-eastward from the eastern point of Oeyŏn do, and a cliffy peaked islet, 164 feet (50^m0) high, covered with low trees, lies nearly half a mile south-eastward of this point; Su do comprises two islets, 101 feet (30^m8) and 67 feet (20^m4) high respectively, lying within a distance of half a mile further south-eastward. 40

Kwangjang do (Cliff islet), situated nearly 1½ miles northward of the eastern point of Oeyŏn do, is a bare, prominent, reddish-brown islet, 111 feet (33^m8) high.

Soch'ŏng do, situated about 4 cables west-north-westward of the north-western point of Oeyŏn do, is 121 feet (39^m9) high and covered 45 with grass, with cliffy coasts; a rock, 12 feet (3^m7) high, lies about a quarter of a mile southward of it. Taech'ong do, situated about 1½ cables westward of Soch'ŏng do, with foul ground between, is 427 feet (130^m1) high and is covered with grass, with cliffy coasts.

Oeyŏndo myoji.—**Directions.**—Oeyŏndo myoji (Oiyonuto anchor- 50 age) is the area enclosed by Oeyŏn do, Taech'ong do, Hoenggyŏn do, and O do, and it can be entered from north-westward or south-eastward, but the former is preferable; the latter should not be used without local knowledge. The northern part of this area has

Charts 3480, 1262, 2347.

Chart 913.

moderate depths and a sandy bottom, whilst the southern part is deeper and the bottom is rocky. The anchorage is safe except with winds from between west and north-north-west.

- 5 Vessels approaching the anchorage from southward should steer to pass midway between Hwang do and Se ye, and for the western point of Taech'ong do when it bears 078° ; when the eastern extremity of Hoenggyŏn do bears 168° , steer for the 554-foot (168^m9) high peak on the south-western end of Oeyŏn do bearing 114° , and anchor
10 when Hong sŏ (*Lat. $36^{\circ} 13' N.$, Long. $126^{\circ} 03' E.$*) bears 152° , in a depth of about 9 fathoms (16^m5).

- From the northward, vessels should pass about $1\frac{1}{2}$ miles eastward of Pyŏn do, and steer for the eastern extremity of Hoenggyŏn do, bearing 168° , and thence for the 554-foot (168^m9) high peak on
15 Oeyŏn do when it bears 114° and as directed above.

With winds from between south-west and north-east, through north, sheltered anchorage can be obtained off the southern side of Oeyŏn do.

Chart 3699.

- 20 **Islands and dangers north-eastward of Oeyŏn yŏlto.**—Kilsan yŏlto is a group of four precipitous islets lying in an east and west direction on a rocky bank. Taegilsan do (Chirumi to), 342 feet (104^m2) high, the westernmost and largest of this group, lies about $5\frac{1}{2}$ miles north-eastward of Oeyŏn do and has a prominent cliff on its western side;
25 there is a small islet close off its eastern extremity. Chunggilsan do, lying about 4 cables eastward of Taegilsan do, is 134 feet (40^m8) high and has a rock, which dries 8 feet (2^m4), close off its southern side. Sogilsan do, the easternmost islet of the group, is 131 feet (39^m9) high and has depths of from $3\frac{1}{2}$ to $5\frac{1}{2}$ fathoms (6^m4 to 10^m5) around;
30 the other three islets are practically connected to each other by rocky ledges which dry.

- Eastward of Kilsan yŏlto, and separated from it by a deep channel about one mile broad, is an extensive shoal with several islands on it. Ho do (to), the largest island of this group, lies with its southern extremity nearly $1\frac{1}{2}$ miles east-north-eastward of Sogilsan do; its
35 summit, 277 feet (84^m5) high, is situated in the southern part of the island, and in the northern part is a hill 246 feet (75^m0) high, with pine trees on its summit. There are a few dwellings on the shingle beach at the head of a small bay on the northern coast of Ho do.
40 Myŏngdŏk to, 222 feet (67^m7) high, lies about 3 cables off the north-western point of Ho do, and is connected to it by a rocky ledge which dries. Hŭk sŏ, 67 feet (20^m4) high, lies on a reef, which mostly dries, extending about 4 cables from the western point of Ho do. Foul ground, with a rock, 21 feet (6^m4) high, on its outer end, extends about
45 a quarter of a mile south-westward from the southern extremity of Ho do; foul ground, with some rocks which dry, extends about 6 cables off the south-eastern side of Ho do.

- Nok to (Noku somu), 366 feet (111^m6) high, lies about three-quarters of a mile southward of Ho do and has two prominent groups
50 of trees, the northern being on the summit of the island. A village, the largest amongst these islands, is situated on the southern part of the eastern coast. Mo do, an islet 106 feet (32^m3) high, is situated close off the western coast, and a rock, which dries 18 feet (5^m5), lies about a quarter of a mile south-westward of this islet. A sandbank,

Charts 3480, 1262, 2347.

Chart 3699.

with depths of less than 6 feet (1^m8) over it, extends as much as half a mile from the eastern side of Nok to ; Sök to lies on this bank and about 3 cables eastward of the southern end of Nok to, and a patch, which dries one foot (0^m3), lies close northward of Sök to (*Lat.* $36^\circ 16'$ N. *Long.* $126^\circ 16'$ E.) 6

Sohwasa do, lying about one mile east-south-eastward of the southern point of Nok to, is a small island thickly covered with grass, with a conical summit 283 feet (86^m3) high ; a rocky ledge which dries, extends about 4 cables from its western side towards Nok to, 10 and close northward of this ledge is a rock which dries about 24 feet (7^m3). Taehwasa do (Fukusaku to), situated about half a mile south-westward of Sohwasa do, is 296 feet (90^m2) high and precipitous on its south-western side ; a prominent rock of peculiar shape lies on a rocky ledge which extends a short distance from its southern 15 point. A rock, which dries 9 feet (2^m7), lies about one cable off the north-western point of Taehwasa do, and a detached rock which dries 13 feet (4^m0), lies about 4 cables west-south-westward of the southern point of the same island.

During the fishing season, in summer and autumn, numerous fishing 20 nets are laid out on the bank on which these islands are situated ; small craft passing between them must, therefore, exercise caution.

O do (Mondoki tō) 233 feet (71^m0) high, lying about $2\frac{1}{2}$ miles northward of the north-eastern point of Ho do, is a conical islet covered with grass. Osi sō (Yaaton nyo), situated about $1\frac{1}{2}$ miles west- 25 north-westward of O do, is an isolated rock which dries 9 feet (2^m7).

Tidal streams.—In the channel between Sogilsan do, on the western side, and Ho do and Nok to, on the eastern side, the tidal stream sets northward with the rising tide and southward with the falling tide, the maximum rate being about 2 knots. 30

Islets and dangers eastward of Ho do and Nok to.—Ch'u do (Son nyo) is a precipitous, rocky islet, 138 feet (42^m1) high, lying about $1\frac{1}{2}$ miles north-eastward of the northern extremity of Nok to ; it is surrounded by a sandbank, which extends as much as 4 cables from its southern side, and on which are several rocks, which dry. 35

Kirūng am and Oejōm do (Chirumeamu) lie together on a bank with depths of less than 3 fathoms (5^m5) over it, and are connected to each other by a rocky ledge which dries. Kirūng am, the south-western of the two, lies nearly $1\frac{1}{2}$ miles east-north-eastward of Ch'u do, and is a black rock 51 feet (15^m5) high ; Oejōm do (*Lat.* $36^\circ 18'$ 40 N., *Long.* $126^\circ 20'$ E.), lying nearly half a mile north-eastward of Kirūng am, is an islet 180 feet (54^m9) high, covered with grass.

Kwang sō consists of four rocks, the south-western of which, named Hahong sō (Norubun yo), lies about $2\frac{1}{2}$ miles south-eastward of Ch'u do and dries 20 feet (6^m1) ; Sanggwang sō, the middle rock, dries 24 feet 45 (7^m3) ; the other two dry 4 feet (1^m2) and 11 feet (3^m4), respectively.

Pulmo do (Furumu somu), 187 feet (57^m0) high, lies about three-quarters of a mile east-north-eastward of Oejōm do, and has a group of pine trees in the middle ; the coasts are cliffy. A shoal, with depths of less than 6 feet (1^m8) over it, extends about 4 cables from 50 the northern side of the islet, and on it are several small islets and rocks, which dry. A shoal, with depths of less than 5 fathoms (9^m1) over it, extends nearly half a mile from the southern side of Pulmo do.

Sapsi do (Sapuchu to), lies with its southern extremity nearly one

Chart 3699.

mile northward of Pulmo do ; its summit, 354 feet (107^m9) high, is situated in the south-western part, and the south-western extremity of the island is a prominent white cliff. The southern and eastern
 5 coasts are mostly white sandy beaches, fronted by sand-banks which dry. The northern extremity is a prominent red cliff, from which a reef, which dries, extends about 4 cables northward. Sapsi do lies on a bank with depths of less than 3 fathoms (5^m5) over it ; a rock, which dries 8 feet (2^m4), lies on the northern edge of this bank
 10 and about three-quarters of a mile northward of the northern extremity of the island. Mulgön sö (Murukunu yo), a rock 5 feet (1^m5) high, lies on the north-western edge of this bank.

CH'ÖNSU MAN AND APPROACHES.—General remarks.—Ch'önsu man (Sajan kaye) extends about 15 miles northward from its entrance,
 15 situated about 7 miles north-eastward of Pulmo do, to where a promontory divides it into two arms, both of which dry except for narrow channels in the middle ; the eastern coast of Anmyōn do (Ammin to) forms the western side of this gulf. Just within the entrance are numerous islets and reefs, so that the fairway into the
 20 sound is somewhat tortuous, but for some miles within these there is plenty of room, and the depths are convenient for anchoring.

Islands and dangers in the approach to Ch'önsu man.—Yong to (Yongu somu), a small islet, 126 feet (38^m4) high, with some low trees on its summit, lies about 3½ miles south-south-eastward of Pulmo do
 25 and on the western side of the approach to Ch'önsu man ; a rock, which dries 7 feet (2^m1), lies close off the western side of this islet. Some sandbanks, with depths of less than 3 fathoms (5^m5) over them, lie within a distance of one mile southward and eastward of Yong to. A rock, which dries 4 feet (1^m2), lies about 2 miles south-south-
 30 eastward of Yong to, and sandbanks, with depths of from 2½ to 5 fathoms (4^m6 to 9^m1) over them, extend about 4 miles further southward. Less water was reported, in 1951, at the southern end of these sandbanks.

A rock, which dries 20 feet (6^m1), lies nearly 1½ miles north-north-
 35 eastward of Yong to, and close northward of this rock is a rock which dries 11 feet (3^m4). A sandbank, with a least depth of 1½ fathoms (3^m2) over it, lies about one mile eastward of these two rocks, and another sandbank, with a least depth of one fathom (1^m8) over it, lies with its western extremity about 1½ miles northward of the rocks ;
 40 these two sandbanks lie on the western side of the fairway, and there are depths of less than 5 fathoms (9^m1) between them.

Tasurigiiamu (*Lat.* 36° 17' N., *Long.* 126° 29' E.), a rock 46 feet (14^m0) high, with two peaks of a reddish-grey colour, lies about 3½
 45 miles east-north-eastward of Yong to and on the eastern side of the fairway ; this rock lies on the western side of a bank with a least depth of 4 feet (1^m2) over it. A 4½-fathom (8^m7) patch lies about three quarters of a mile westward of Tasurigiiamu, and a bank, with depths of less than 5 fathoms (9^m1) over it, extends about 1½ miles southward from a position about one mile south-westward of this rock.

50 Soniyoamu, situated about 2 miles northward of Tasurigiiamu and 1½ miles off the eastern side of the channel, consists of three rocks which dry from 7 to 14 feet (2^m1 to 4^m3) ; they are marked by ripples, except during the period of slack water.

Charts 913, 1258, 1256, 3480, 1262, 2347.

Chart 3699.

Wōnsan do (Onsan to) lies with its south-eastern extremity about $2\frac{1}{2}$ miles north-north-westward of Soniyoamu ; its summit is situated in the western part of the island, and is 401 feet (122^m2) high. A pine wood on a hill 267 feet (81^m4) high, situated on the eastern extremity, is a useful mark when approaching Ch'ōnsu man. The southern side of the island consists mostly of sandy beaches, and a shoal, with depths of less than 3 fathoms (5^m5) over it, which partly dries, extends fully 2 miles southward ; Naptaeji do (Nafutegii somu), an islet 50 feet (15^m2) high, covered with grass, lies on the south-western end of this shoal and nearly 2 miles southward of the south-western end of Wōnsan do. Some rocks, which dry 15 feet (4^m6), lie about a quarter of a mile northward of Naptaeji do. A reef, over which there is a tide race, extends about 3 cables south-eastward from the south-eastern point of Wōnsan do, and there is an isolated 7-fathom (12^m8) rock about 8 cables east-south-eastward of the same point. The northern coast is indented by several bays, but they all dry ; there are some villages on this side of the island. There is foul ground between the northern side of Wōnsan do and the southern end of Anmyōn do.

Oejanggo do (Petchanko to), 139 feet (42^m4) high, lies about $2\frac{1}{2}$ miles west-north-westward of Wōnsan do and on the bank, with depths of less than 3 fathoms (5^m5) over it, which extends from the south-western end of Anmyōn do, and is surrounded by shoals and rocks, which extend about $1\frac{1}{2}$ miles from its western side and terminate in a rock awash ; the north-eastern and southern extremities of the island are cliffy, and there are shingle beaches along the other portions of the coast. Kodae do (Kodei to) lies about midway between Oejanggo do and Wōnsan do, and is surrounded by rocky ledges and sandbanks ; its summit, 271 feet (82^m6) high, is situated in the southern part of the island.

Entrance.—Anchorage.—Islets and dangers.—Tidal streams.—Song do (Soru somu) (*Lat.* $36^{\circ} 23' N.$, *Long.* $126^{\circ} 29' E.$) is an islet lying on the mud bank which extends from the main coast on the eastern side of the entrance to Ch'ōnsu man, and lies about $1\frac{1}{4}$ miles north-eastward of the eastern extremity of Wōnsan do ; there is a bare hill, with a rounded summit, 223 feet (68^m0) high, on its western end. A reef extends about 4 cables south-westward from the southern side of the island, and on this reef is an islet, 36 feet (11^m0) high, and several rocks which dry. Chuk to, an islet 58 feet (17^m7) high, lies on the coastal bank nearly one mile south-eastward of Song do ; a reef which dries, lies on the edge of the coastal bank about 6 cables southward of Chuk to. A reef, which dries, extends about a quarter of a mile from a point situated on the coast about half a mile northward of Song do.

Vessels which do not wish to proceed up Ch'ōnsu man can anchor about $1\frac{1}{4}$ miles eastward of the eastern extremity of Wōnsan do, in a depth of 7 fathoms (12^m8), sand and shells, with a group of prominent trees on Ponha san, a hill 763 feet (232^m6) high, situated about $1\frac{1}{4}$ miles eastward of Song do, in line with Chuk to, bearing 057° , and the summits of Ch'u do (Chu to) and Mongdōk to (Somumondoki), two islets within the entrance to Ch'ōnsu man, in line bearing 318° ; this anchorage is sheltered from all except southerly winds, and the tidal streams are not strong.

Charts 913, 3480, 1262, 2347.

Chart 3699.

Hyoja do (to) lies about 2 cables off the north-eastern side of Wönsan do and has a hillock, 142 feet (43^m3) high, on its northern extremity; a shoal, with depths of less than 3 fathoms (5^m5) over it, extends fully half a mile southward from the eastern extremity of Hyoja do, and Yungmongdök, a small islet 34 feet (10^m4) high, lies on the drying reef which extends about one cable eastward from this point. The channel between Hyoja do and Wönsan do has depths of from $5\frac{1}{2}$ to 9 fathoms (10^m1 to 16^m5), but shoals extending from either side reduce the width of the fairway to about half a cable, and the tidal streams sometimes attain a rate of 5 knots.

Mongdök to (Somumondoki) is a small islet, 46 feet (14^m0) high, lying nearly half a mile north-eastward of the eastern extremity of Hyoja do, and a reef, which dries, extends about half a cable from its western side. There is a least depth of 8 fathoms (14^m6) in the fairway of the channel between Mongdök to and Hyoja do.

Chan sō (Sein yo) consists of two rocks, the southern of which lies about $3\frac{1}{4}$ cables northward of Hyoja do and dries 7 feet (2^m1); the northern rock dries 15 feet (4^m6). These rocks are plainly marked by overfalls, except from one hour before to one hour after high water. So do (tō) lies close off the south-eastern end of Anmyōn do, about 3 cables north-westward of Chan sō, and has a wooded hillock, 118 feet (36^m0) high, on its south-western end. Ch'u do (Chu to) (*Lat.* $36^{\circ} 24' N.$, *Long.* $126^{\circ} 26' E.$) lies about a quarter of a mile northward of the eastern end of So do, and has a densely wooded and somewhat prominent hill, 101 feet (30^m8) high, almost in the middle. Nojiji do is a rocky islet lying about 6 cables north-eastward of Ch'u do; it is surrounded by a reef, which extends about one cable from the southern, western and northern sides of the islet. All these islets and dangers lie on the western side of the main channel into Ch'ōnsu man.

On the eastern side of the main channel are several islets and numerous reefs. These include Samhyōngje do (Punuyuku somu), 81 feet (24^m7) high, and Yuk to, 64 feet (19^m5) high, which lie on the western side of a group which extends to within about half a mile of the eastern side of the entrance; details of all these can best be seen from the chart.

Inner part of Ch'ōnsu man.—Islets and dangers.—Beacon.—

Anmyōn do (Ammin to), on the western side of Ch'ōnsu man, is a hilly wooded island separated from the mainland northward by a narrow passage named Paeksa sudo, which is impracticable even for boats except near high water. At the south-eastern end of the island, and nearly three-quarters of a mile northward of Ch'u do, is a prominent headland 167 feet (50^m9) high. Changgo do (Neijanko to), an islet 141 feet (43^m0) high, with a group of trees on its summit, lies about three-quarters of a mile northward of this headland and on the edge of the mud bank which extends from the coast; a reef, which dries, extends about 2 cables south-eastward from the southern point of Changgo do, and on this reef is Nogo am (*Lat.* $36^{\circ} 26' N.$, *Long.* $126^{\circ} 26' E.$), a rock 34 feet (10^m4) high. An isolated rock, which dries 5 feet (1^m5), lies about 4 cables south-eastward of Nogo am and on the northern end of a reef with a depth of $1\frac{1}{4}$ fathoms (2^m3) over it; a small sandbank, with a least depth of $1\frac{1}{2}$ fathoms (3^m2) over it, lies about 4 cables eastward of this rock, and a $4\frac{1}{4}$ -fathom (7^m8) patch lies about $3\frac{1}{2}$ cables north-eastward of the same rock. A

Charts 913, 3480, 1262, 2347.

Chart 3699.

2½-fathom (4^m1) patch lies about 4 cables north-eastward of Changgo do. Kye do (Taku somu), an islet 133 feet (41^m5) high, with a group of trees on its summit, lies about three-quarters of a mile northward of Changgo do and on the edge of the mud flat which extends from the coast ; a rock, 16 feet (4^m9) high, lies about 2 cables southward of Kye do. Taeyo do and Na am are the largest of several islets situated on the coastal bank within about 3 miles northward of Kye do. A reef, which dries, and has three rocks above water on it, lies about half a mile north-north-eastward of Kye do, and about one mile northward of this islet is a small rock in the middle of a sandbank.

Och'ön hang is an inlet on the eastern side of Ch'önsu man, and is entered about 2½ miles northward of Song do (page 585). A shoal, with a depth of 1½ fathoms (2^m7) over it, lies in the middle of the entrance to this inlet, and a short distance further inside is a bar with a least depth of 3 feet (0^m9) over it, except for a small portion near the middle, which dries 4 feet (1^m2). For fully 1½ miles inside the bar there are depths of from 2 to 6 fathoms (3^m7 to 11^m0) in a channel about 2 cables broad. Osen (Suyon), a village containing a post office, is situated on the southern shore of the inlet and about 1½ miles within the entrance. A shoal, which partly dries, lies about one mile off-shore opposite the entrance to Och'ön hang. Nearly 1½ miles north-north-westward of the northern entrance point to Och'ön hang, is a small islet 37 feet (11^m3) high ; a reef, with a depth of one fathom (1^m8) over its outer end, extends about 4 cables south-westward from this islet. Nearly half a mile south-eastward of this islet, and connected to it by a sandy spit, is an islet 42 feet (12^m8) high, with a single pine tree on its summit ; rocks, which dry, extend about half a mile south-westward from this latter islet, and a reef, which dries, lies about half a mile north-westward of the 37-foot (11^m3) high islet and is connected to the coast by a shingle spit. A stone beacon, 7 feet (2^m1) high, surmounted by a drum, is situated on the summit of a hill, 694 feet (211^m3) high, about 6 miles northward of Song do. Mosan do is an islet lying at the entrance to a creek about 8 miles northward of Song do. A number of shoals, on some of which there are several islets covered with trees and grass, including Chuk to (Denudée islet), as well as drying rocks and an extensive drying bank named Tae ju, are situated near the centre of the gulf from about 2 to 9 miles northward of Kye do, and join the coastal bank extending from Anmyön do at their northern end ; the positions of all these can best be seen from the chart.

Kanwöl to, 155 feet (47^m2) high, lies nearly 10 miles northward of Kye do, at the southern end of a drying mud bank which divides the head of the gulf into two arms ; the eastern arm is called Sajang p'o, and the western arm Chöktol gang (Chakuto). Chinhwa gi is the eastern entrance point to Sajang p'o. Kōmho do (Kencho to), 111 feet (33^m8) high, lies about 2 miles west-north-westward of Kanwöl to.

Directions.—Vessels bound for Ch'önsu man from southward should make for Yōn do (page 579), and from a position about 2 miles westward of this island should steer for the 186-foot (56^m7) high hill on the extremity of the promontory separating Kabam p'o and Taech'on hang (page 579), bearing 022°. When Churyōm (Chuyomu) san, a peak 1,141 feet (347^m8) high, situated at the head of Beijaa

Charts 913, 1258, 1256, 3480, 1262, 2347.

Chart 3699.

man (page 579), is over the northern entrance point of that bay, bearing 092°, vessels should steer for the summit of Wönsan do (page 585), bearing 347°. When Yong to (page 584) bears 308°, the
 5 western extremity of Song do should be kept just open to eastward of the beacon on the 694-foot (211^m3) high hill, bearing 012°, which leads about half a mile westward of Soniyoamu. When fully one mile from Song do alter course north-westward with the western end of Ch'u do in line with the 263-foot (80^m2) high hill situated about
 10 one mile north-westward, bearing about 322°, thus passing midway between Yungmongdök and Mongdök to; thence keep the eastern extremities of Wönsan do and Hyoja do in line, bearing 167° astern, which leads between Ch'u do (*Lat. 36° 24' N., Long. 126° 26' E.*) and Samhyöngje do, when course should be shaped to pass between
 15 Nojiji do and Yuk to.

Vessels bound for Ch'önsu man from northward or north-westward should steer for Yön do after passing between Kilsan yölto and Oeyön yölto, and thence follow the directions given for vessels from southward.

20 Small vessels bound for Ch'önsu man from northward can steer for Yong to bearing 140°, and seen midway between Oejöm do and Pulmo do (page 583); when the summit of Taegilsan do (page 582) is in line with the northern extremity of Nok to, bearing 274°, this mark should be kept astern, which leads between the shoals north-
 25 eastward of Yong to. When the western extremity of Song do bears 012°, proceed as directed for vessels from southward.

Tidal streams.—The tidal streams in Ch'önsu man run northward and southward; the north-going stream runs from about 6 hours before high water to the time of high water at Inch'ön (Admiralty
 30 Tide Tables Standard Port), and the south-going stream from the time of high water until 6 hours later, slack water only lasting for about 10 minutes. The maximum rate of the tidal streams near Tasurigihamu is from 1½ to 2 knots; in the channel between the islets in the entrance the maximum rate is from 4½ to 6½ knots.

35 Heavy overfalls occur off the south-eastern extremity of Wönsan do and on the eastern side of the fairway. Near the northern end of Hyoja do the tidal streams are very irregular and may thus cause the vessel to yaw.

COAST.—Western side of Anmyöñ do.—Islets and dangers.—

40 The western coast of Anmyöñ do is indented by numerous bays, but they are all encumbered by flats which dry; banks of sand and mud, with rocky ledges, extend from this coast and dry out nearly three-quarters of a mile in places.

Sarusoguni, 164 feet (50^m0) high, is a small islet lying close inshore
 45 about 2 miles northward of Oejanggo do (page 585). There is a single prominent pine tree on a hill, 354 feet (107^m9) high, situated about one mile north-eastward of Sarusoguni; this is the highest peak in the southern part of Anmyöñ do.

Oe do (Oiyomu), 153 feet (46^m3) high, lies about 1½ miles north-
 50 westward of Sarusoguni and nearly 1½ miles offshore, and foul ground extends about half a mile from its south-eastern and south-western sides; it is connected to the western coast of Anmyöñ do by a bank with depths of less than 3 fathoms (5^m5) over it. A rock,

Charts 913, 1258, 1256, 3480, 1262, 2347.

Chart 3699.

which dries 12 feet (3^m7), lies about one mile north-north-westward of Oe do ; a $2\frac{1}{2}$ -fathom (5^m0) patch lies close north-eastward of this rock, and a bank, with a least depth of 4 fathoms (7^m3) over it, lies from half a mile to $1\frac{1}{2}$ miles north-westward of it. A rock, with a depth of 3 fathoms (5^m5) over it, lies nearly 4 miles northward of Oe do (*Lat.* $36^\circ 27' N.$, *Long.* $126^\circ 18' E.$) and about one mile offshore.

The south-western entrance to Paeksa sudo (page 586) lies about $6\frac{1}{2}$ miles northward of Oe do. Anma do, an islet 125 feet (38^m1) high, lies on the mud bank on the northern side of the entrance ; several rocks, which dry, known as Kakjö ch'o (Kakushi yo), lie within a distance of one mile southward of this islet.

Off-lying islands and dangers.—Neap'asu do (Ampassu to), 189 feet (57^m6) high, lies about 3 miles westward of Oe do, and a shingle spit, which dries, extends about 2 cables from its eastern side ; a reef, with a rock above water on its outer end, extends about 3 cables south-westward from the southern point of the island. Pun sō (Punu yo) is a group of rocks, the highest of which, 68 feet (20^m7) high, lies about 4 cables north-westward of Neap'asu do. Oep'asu do (Tappassu to), 226 feet (68^m9) high, lies about $1\frac{1}{2}$ miles south-westward of Neap'asu do, and has some low trees on it ; a reef, with a rock above water on its outer end, extends about 2 cables from its north-eastern side, and a rock, 64 feet (19^m5) high, lies about $1\frac{1}{2}$ cables off the south-western point of the island and is almost connected to it by a reef which dries. A reef, which was reported in 1907, is charted nearly one mile north-westward of Oep'asu do, but its position is doubtful ; it is stated to dry 5 feet (1^m5). A rocky shoal, with a depth of $1\frac{1}{2}$ fathoms (2^m7) over it, was reported, in 1945, to lie about a mile north-westward of Oep'asu do.

Nach'i do (to), situated about $4\frac{1}{2}$ miles north-westward of Neap'asu do, is a conical island, 290 feet (88^m4) high, covered with low trees and grass, and has cliffy coasts ; there is a prominent rock, 20 feet (6^m1) high, close off its western side, and a rock, which dries 13 feet (4^m0), lies about 3 cables westward of the island.

Chart 913.

Tae sō (Tei nyo), 59 feet (18^m0) high, situated about $4\frac{1}{2}$ miles west-south-westward of Nach'i do, has two summits and is easily identified owing to its light-grey colour ; a small rock lies close off its south-western side and is connected to it by a reef which dries.

A shoal, with a least depth of 9 fathoms (16^m5) over it, lies about 4 miles westward of Tae sō.

Chart 3699.

T'o do (Toki somu), 130 feet (39^m6) high, is the western of a group of four islets which lies about $3\frac{1}{2}$ miles north-north-eastward of Nach'i do ; it is separated from the other three, which are connected to each other by rocky ledges and sandbanks, by a clear channel with depths of from 5 to 8 fathoms (9^m1 to 14^m6) ; Chich'ae do, the southern of these three, is 226 feet (68^m9) high and lies nearly three-quarters of a mile eastward of T'o do. A shoal, with a depth of 3 fathoms (5^m5) over it, lies about half a mile eastward of Chich'ae do. A rock, 59 feet (18^m0) high, lies on the sandbank which extends north-eastward from Kwan do (Samu somu), the middle islet, which is 158 feet (48^m1) high. Ulmi do (Ummi somu), 193 feet (58^m8) high, is the northern islet of the group.

Charts 1258, 1256, 3480, 1262, 2347.

Chart 3699.

Kōa do (Kouru to) lies about $1\frac{1}{2}$ miles eastward of Ulmi do (*Lat.* $36^{\circ} 36' N.$, *Long.* $126^{\circ} 12' E.$) and about 2 miles off the main coast ; its summit, 252 feet (76^m8) high, is at the northern end, and on the
 5 southern extremity of the island is a conical hill 248 feet (75^m6) high. A rock, 6 feet (1^m8) high, lies close off the southern point of Kōa do ; Kasa sō, a rock which dries 10 feet (3^m0), lies about half a mile south-south-westward of this point, and Sōn sō, a rock which dries 14 feet (4^m3), lies about half a mile southward of the same point. A shingle
 10 spit extends about 7 cables eastward from the northern end of this island.

Charts 3699, 913, 1258.

Coast.—Islands and dangers.—Between the point on the northern side of the south-western entrance of Paeksa sudo and Kwansu gak,
 15 a point situated about 11 miles north-westward, the coast is indented by two bays, separated from each other by a peninsula, close off the extremity of which are some islands, which are described below.

Chart 3699.

Namhae p'o (Nanhai po), the south-eastern of these two bays has
 20 depths of less than 3 fathoms (5^m5) over the greater part, and there are several rocks, which dry, in it ; the positions of these can best be seen from the chart. Mayo p'o (Mafunge) is situated about $2\frac{1}{2}$ miles northward of the entrance to Paeksa sudo. Aru to is a small islet, 39 feet (11^m9) high, lying about 3 miles north-north-westward of
 25 Mayo p'o.

Charts 913, 1258.

Sinjin do (Mulsan to), 421 feet (128^m3) high, the largest of the islands off the peninsula separating the two bays, is round-topped, and an islet lies about 2 cables off its south-western point and is
 30 connected to it by a reef which dries.

Chart 3699.

A rock, with a depth of less than 6 feet (1^m8) over it, with a reef which dries 7 feet (2^m1) close eastward of it, lies about $1\frac{1}{2}$ miles south-eastward of Sinjin do. Anhung (Santo) is a village at the outer end
 35 of the peninsula separating the two bays, and opposite Sinjin do.

Charts 913, 1258.

Ma do (*Lat.* $36^{\circ} 41' N.$, *Long.* $126^{\circ} 08' E.$) lies about a quarter of a mile north-westward of Sinjin do and is 223 feet (68^m0) high.

The north-western bay practically dries throughout, and only boats
 40 can proceed up it for about 3 miles. A peak 713 feet (217^m3) high, with a pointed boulder on its summit, is situated on the north-western end of the peninsula which separates these two bays, and is prominent. A reef extends about three-quarters of a mile south-westward from Kwansu gak, and on it lies an islet 256 feet (78^m0) high.

45 **Off-lying islands and dangers.—Kwanjanghang sudo.**—Ong do (Toku somu), 228 feet (69^m5) high, is a conical islet lying about $6\frac{1}{2}$ miles south-westward of Kwansu gak, and is the outermost of a chain of islets and rocks which extends south-westward from that point.

50 Kaūi do (Kai to) lies with its south-western extremity about 2 miles north-eastward of Ong do and has several peaks, the summit being 592 feet (180^m4) high. Tan do (Kutsu somu), 277 feet (84^m4) high, lies about half a mile westward of the south-western point of Kaūi do. There are several rocks and reefs between the north-eastern point of

Charts 1256, 3480, 1262, 2347.

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<i>Kwansu</i> (Cliffed islands). (Northern islet is not shown.)	<i>Sōk to</i> (Long I.)	<i>Sodein.</i>	<i>Penpen</i> (Pimpen).	<i>Nan do</i> (Ana somu).	<i>Kuness do</i> (Kunshi).	<i>Hūk to</i> (Gubbins I.), bearing 000°, 13 miles. (Lt. no. not shown.)	<i>Ong do Tan do</i> (Taku (Kutsu somu)). (Lt. no. not shown.)	<i>Kaūi do</i> (Kai lo).
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Islets westward of Kwansu gak.
(Original dated 1899).

Charts 913, 1258.

Kaūi do and the reef extending from Kwansu gak. One of these, 33 feet (10^m1) high, lies nearly one mile north-north-eastward of the north-eastern point of Kaūi do ; a reef extends about 4 cables southward from this rock, leaving a clear passage 4½ cables wide, with a least depth of 7 fathoms (12^m8), between it and the north-eastern point of Kaūi do, and which forms the northern entrance to Kwanjanghang sudo (Kanjammoku channel). In bad weather, especially with strong southerly winds, there is a heavy sea between Ong do and Kaūi do, and also for some distance westward of the former. 10

The southern entrance to Kwanjanghang sudo lies between Ong do and Chōngjok to, an islet 139 feet (42^m4) high, lying about 3½ miles eastward ; a large flat rock is connected to the south-western side of Chōngjok to by a ledge which dries. A rock, which dries 10 feet (3^m0), lies about three-quarters of a mile northward of Chōngjok to, 15 and Mokkae do, an islet, 198 feet (60^m3) high, lies about 1½ miles eastward of the latter ; a rock, 8 feet (2^m4) high, lies about 3 cables northward of Mokkae do. A shoal, with a depth of 4½ fathoms (7^m8) over it, lies about three-quarters of a mile eastward of Mokkae do. Hwagi sō (*Lat.* 36° 40' N., *Long.* 126° 07' E.), 29 feet (8^m8) high, 20 lies about 1½ miles north-north-westward of Mokkae do, and a reef extends about 2 cables north-eastward from it ; a rock, which dries 17 feet (5^m2), lies about midway between Hwagi sō and the 8-foot (2^m4) high rock previously mentioned. A rock, the position of which is approximate, was reported in 1945, to lie about three-quarters of 25 a mile northward of Hwagi sō.

Kwanjanghang sudo is sometimes used by small vessels proceeding to Inch'ōn (page 604) from the southward or vice versa ; these vessels can also pass eastward of Mokkae do and Hwagi sō.

Light.—Fog signal.—A light is exhibited, at an elevation of 237 feet (72^m2), from a white octagonal concrete tower, 56 feet (17^m1) in height, situated on Ong do.

A fog signal is sounded from the lighthouse.

Tidal streams.—The tidal streams off the eastern side of Kaūi do run northward and southward ; the north-going stream runs from 35 about 6 hours before to the time of high water at Inch'ōn (Admiralty Tide Tables Standard Port), and the south-going stream from about the time of high water to 6 hours later. The maximum rate is 4 knots ; overfalls occur in places.

OUTLYING ISLETS AND BANKS.—A chain of islets, including 40 those described with Kwanjanghang sudo, extends nearly 30 miles westward from Kwansu gak. See view facing this page.

Kyōngnyōlbi yōlto (Clifford islands), the outermost of these, comprises three islets, the eastern and largest of which, Tonggyōngnyōlbi do (Kaori) is 435 feet (132^m6) high and lies about 20 miles 45 westward of Ong do. Pukkyōngnyōlbi do (Muruchii) is 331 feet (100^m9) high and lies about half a mile north-westward of Tonggyōngnyōlbi do. Sōgyōngnyōlbi do (Manoru) is 253 feet (77^m1) high, and lies about 1½ miles westward of Tonggyōngnyōlbi do.

Sōk to (Long island), situated about 6 miles eastward of Pukkyōngnyōlbi do, is 320 feet (97^m5) high and has a rock, named Sakusomu, close off its northern extremity, which resembles a junk when seen from eastward or westward ; a rock, 37 feet (11^m3) high, 50

Charts 1256, 3480, 1262, 2347.

Charts 913, 1258.

lies close off the south-western side of Sōk to, and another rock close off its eastern side.

Sodein, an islet 447 feet (136^m2) high, situated about half a mile south-eastward of Sōk to, appears conical when seen from eastward or westward, but shows two rounded hummocks of unequal elevation when seen from northward. Foul ground extends about a quarter of a mile northward and nearly half a mile south-westward from Sodein.

10 Penpen (Pempen), an islet 296 feet (90^m2) high, situated about 2½ miles north-eastward of Sodein, has a rock, which dries 16 feet (4^m9), about 1½ cables off its south-western point.

Nan do (Aru somu), 285 feet (86^m9) high, lies about 3½ miles eastward of Penpen, and Kungsi do (Kunshi), 286 feet (87^m2) high, lies about 1½ miles further eastward; three rocks lie close together about three-quarters of a mile south-westward of Kungsi do, the highest being 171 feet (52^m1) high.

Hūk to (Gubbins island), 315 feet (96^m1) high, situated about 5 miles north-eastward of Kungsi do, is easily identified owing to its double summit, the northern being densely wooded and the southern covered with grass; there are some dwellings on the eastern side of the islet.

Chart 1258.

Kadae am consists of two isolated rocks lying about 3 miles north-eastward of Hūk to; the western rock is 6 feet (1^m8) high, and the eastern is 7 feet (2^m1) high.

A narrow bank, with depths of from 7 to 10 fathoms (12^m8 to 18^m3) over it, extends about 8½ miles north-eastward from a position about 4 miles west-north-westward of Hūk to. North-eastward of this bank, and about 9½ miles north-north-eastward of Hūk to, is a bank with a least depth of 8 fathoms (14^m6) over it.

Charts 913, 1258.

Light.—Fog signal.—A light is exhibited, at an elevation of 341 feet (103^m9), from a white framework structure, 42 feet (12^m8) in height, situated on the northern side of Pukkyōngnyōlbi do. A fog signal is sounded from the lighthouse.

Charts 1270, 1258.

COAST.—General remarks.—From Kwansu gak the coast trends generally north-eastward for about 25 miles to the entrance to Togam p'o (Tokugan po), and, from a position about 8 miles north-north-eastward of Kwansu gak, it is very irregular and indented by a series of large and deep inlets.

Chart 1258.

Coast.—The coast between Kwansu gak (*Lat.* 36° 43' N., *Long.* 126° 07' E.) and Chōnggok tu (Chōkoku tō), situated about 11 miles north-north-eastward, is of a hilly nature, the hills being covered with grass and almost devoid of trees; there are villages and cultivated areas between the hills.

Noe do is a small peninsula, 200 feet (61^m0) high, lying nearly 4 miles northward of Kwansu gak, and appears as an islet when seen from northward of southward. Oehyōn is a sharp promontory situated about one mile north-eastward of Noe do, and there are several rocks in the bay between. Kye do, an islet 111 feet (33^m8)

Charts 1256, 3480, 1262, 2347.

Chart 1258.

high, lies close to the coast and about one mile northward of Oehyōn ; a rock, which dries 7 feet (2^m1), lies about 6 cables northward of Kye do.

Taeyōng san, a hill 394 feet (120^m1) high, is situated near the northern end of a peninsula about 8 miles northward of Kwansu gak. Pōl man (Joachim bay) is entered between the northern extremity of this peninsula and Chōnggok tu, situated about 2½ miles northward. About one mile within the entrance the bay divides into two branches, the northern branch of which, named Samga, dries entirely ; Kūnni man, the southern branch, has three arms, and the central one runs for about 4½ miles south-south-eastward, but the greater part of it dries. The entrance to Kūnni man is between two rocky ledges, and is only practicable for boats. The best anchorage is in about the middle of the entrance, in a depth of 10 fathoms (18^m3), fine sand ; the tidal streams are comparatively weak, and attain a rate of from one to 2 knots.

Chart 1270.

Aeng sō (Ō tō), a rock 43 feet (13^m1) high, lies close southward of Chōnggok tu. Between Chōnggok tu and a point situated about 1½ miles north-eastward, there is a bay in which depths of less than 3 fathoms (5^m5) extend over half a mile offshore ; near the eastern entrance point to this bay are two islets, 61 and 173 feet (18^m6 and 54^m7) high, respectively.

About 3½ miles north-eastward of Chōnggok tu is the western entrance point of a large bay which dries almost throughout ; there are several islets and drying rocks in the bay, the largest islet, named Chuk to (Chiku tō), has a tree on its summit, which is 232 feet (70^m7) high.

Off-lying islets and dangers.—Anchorage.—Sin do (Shin tō), an islet 119 feet (36^m3) high, covered with grass, lies about 1½ miles west-north-westward of Chōnggok tu and on the south-western end of Changan t'oe (Chōan tai), a bank which extends about 17 miles north-eastward from this islet, and forms the southern side of the entrance to Tong sudo (Higashi suidō), the principal approach channel to Inch'ōn. There are several islets and patches of sand, which dry, on the bank, but the greater part has depths of between 3 and 6 fathoms (5^m5 and 11^m0) over it. There are two channels across the bank, with depths of over 6 fathoms (11^m0), lying, respectively, about 7 and 11½ miles north-eastward of Sin do ; less water than charted was reported, in 1950, in the vicinity of the former. Both sides of the bank are steep-to. Changan t'oe lies across the entrances of the various inlets on the mainland north-eastward of Chōnggak tu, leaving a channel from 1½ to 2½ miles wide, with general depths of from 10 to 20 fathoms (18^m3 to 36^m6), where temporary anchorage can be obtained, but the tidal streams are strong. A shoal, with a least depth of 37 feet (11^m3) over it, lies near the centre of this channel about 6 miles north-eastward of Sin do (Lat. 36° 54' N., Long. 126° 09' E.).

A reef, with two rocks above water on it, lies about 1½ cables southward of Sin do, and depths of from 4 to 5 fathoms (7^m3 to 9^m1) extend about a quarter of a mile south-westward from this reef.

Tae do (Dai tō), 180 feet (54^m9) high, situated nearly 2 miles north-north-eastward of Sin do, is the largest of a group of islets lying on the

Chart 1270.

south-western part of Changan t'oe, and its south-eastern side is precipitous. Ku do (Ki tō), 42 feet (12^m8) high, and Panghaeng do (Hōkō tō), 25 feet (7^m6) high, lie eastward of Tae do; and Ch'a do (Sha tō), 98 feet (29^m8) high, and Yondōl to (Entotsu tō), 78 feet (23^m8) high, lie westward of that islet. An isolated rocky patch, with a depth of 7 fathoms (12^m8) over it, and steep to all round, lies about 1½ miles west-south-westward of Tae do. An do (tō), 98 feet (29^m8) high, lies nearly 1½ miles northward of Tae do and has a double summit; a 4½-fathom (8^m2) patch lies about half a mile north-eastward of An do.

Light.—A light is exhibited, at an elevation of 119 feet (36^m3), from a white square iron framework tower, 26 feet (7^m9) in height, situated on An do.

Ch'ang p'onaē.—Islands and dangers.—Coast.—Ch'ang p'onaē (Sōhonai), also known as Karorim man, is an inlet penetrating the land for a distance of about 13 miles southward, and its western side is formed by a long, narrow tongue of land, the northern extremity of which is named Mandae dan (Manku tan) and lies about 8 miles north-eastward of Chōnggok tu; Hwanggūm do (Ogon tō), which forms the eastern entrance point of the inlet, lies nearly 1½ miles north-eastward of Mandae dan (*Lat.* 36° 59' N., *Long.* 126° 18' E.) and has a group of trees on its summit, which is 517 feet (157^m6) high; its western side is precipitous. Suni sō (Suiri sho), a reef with three heads, which dry from 6 to 13 feet (1^m8 to 4^m0), lies about 3 cables northward of Mandae dan. Kain sō (Kajin sho), a rock 71 feet (21^m6) high, lies about half a mile west-north-westward of the northern point of Hwanggūm do.

The greater part of Ch'ang p'onaē dries, but there is a narrow channel down the centre, which leads to Kudo myoji (Kyūtō anchorage) at the head. There are numerous islets and rocks on both sides of the fairway, the details of which can best be seen from the chart. Tanji am (Tanshi gan), a sandbank which dries, lies in mid-channel just inside the entrance. The fairway runs westward of Tanji am and eastward of Kop'a do (Koba tō), the largest island in the vicinity of the channel, situated about 4 miles above the entrance. Kop'a do (*Lat.* 36° 54' N., *Long.* 126° 20' E.) is 218 feet (66^m4) high, and has a group of pine trees on the northern side of its summit; the channel westward of Kop'a do is too shallow to be of any use except for boats. The main channel curves round the southern end of Kop'a do and becomes very narrow. Umu am (Gyūbu gan), a small patch of hard sand which dries 3 feet (0^m9), lies about 3½ miles south-south-westward of Kop'a do, and close westward of Umu am is a reef which dries 2 feet (0^m6); the fairway passes westward of the latter and is very narrow.

The village of Kudo (Kyūtō) is situated at the head of the bay, and about 4½ miles above Kop'a do. Kudo myoji, the anchorage off the village, is only available for small craft; two rocks, which dry 8 feet (2^m4) and 5 feet (1^m5), respectively, lie on the eastern side of the anchorage.

There are several prominent hills on the peninsula which separates Ch'ang p'onaē from Tōgam p'o (Tokugan po), the next inlet eastward. Tokkottangsi (Dokkandoji), 217 feet (66^m1) high, is situated about one mile eastward of Hwanggūm do and has a group of pine trees on

Charts 1258, 1256, 3480, 1262, 2347.

Chart 1270.

its summit. Samgil (Sankichi) san, 558 feet (170^m1) high, is a sharp peak lying about 4½ miles further eastward and on the western side of the entrance to Tōgam p'o.

Light.—A light is exhibited from a beacon on the head of a small mole at Kudo. 5

Tōgam p'o.—Islands and dangers.—A number of islands and islets lie off the entrance to Tōgam p'o. Taeranji do (Dairanshi tō), the largest of these, lies with its southern extremity about 2½ miles north-north-westward of Samgil san; it has several peaks, the highest of which has a group of pine trees on its summit, and rises almost perpendicularly from the southern coast to an elevation of 408 feet (124^m4). There is a bay on the eastern coast and another on the northern coast, but both dry entirely. Ch'ōl to (Tetsu tō), 86 feet (26^m2) high, lies about half a mile offshore on a shoal bank which extends about three-quarters of a mile off the western coast of Taeranji do. The north-western extremity of Taeranji do is separated from the north-eastern end of Changan t'oe (page 593) by a narrow channel with depths of over 10 fathoms (18^m3) in the fairway; on the eastern side of this channel, and close to the coast of Taeranji do, is a rock which dries 9 feet (2^m7). 10 15 20

Pigyong do (Hikei tō) lies nearly one mile southward of the south-western point of Taeranji do, and has two summits, the south-eastern, 191 feet (58^m2) high, being slightly the higher of the two; a shoal, with a depth of less than 3 fathoms (5^m5) over the greater part, extends nearly one mile north-westward from the north-western point of Pigyong do, and a rock, which dries 7 feet (2^m1), lies on this shoal and about 3 cables northward of this point. A 13-foot (4^m0) patch lies about midway between the north-western point of Pigyong do and the south-western point of Taeranji do. Hūgō do (Kokugyō tō), 108 feet (32^m9) high, lies about 1½ miles westward of Pigyong do and half a mile northward of T'an kot (Tan kan), the northern extremity of the peninsula separating Tōgam p'o from Ch'ang p'onae; a sandbank, which partly dries, extends about 1½ miles from the western side of Hūgō do (*Lat.* 37° 01' N., *Long.* 126° 23' E.), and also about 4 cables from the eastern side of this islet. Two shoals, with depths of 30 and 34 feet (9^m1 and 10^m4) over them, respectively, lie nearly midway between Hūgō do and Ch'ōl to. Hang do (Kō tō), an islet 60 feet (18^m3) high, with some pine trees on its summit, lies off T'an kot, and a rock, which dries 13 feet (4^m0), lies about 1½ cables northward of Hang do. A rock 6 feet (1^m8) high, lies about midway between Hang do and Pigyong do, and about a quarter of a mile east-south-eastward of this rock is another rock, 9 feet (2^m7) high; these two rocks lie on the edge of the mudbank, which dries, extending from Chang hang (Shō kō), a point situated nearly 1½ miles eastward of T'an kot. The main channel leading to Tōgam p'o is northward of Hūgō do and southward of Pigyong do. 25 30 35 40 45

Charts 1270; 3642, plan of Gazan byochi and approaches.

Other islands and rocks in the entrance lie southward of Taeranji do and eastward of Pigyong do, and include Soranji do (Shōranshi tō), Umu do (Gyūbu tō), Sojo do (Shōchō tō), Taejo do (Daichō tō), Taedopi do (Daitohi tō), Sodopi do (Shōtohi tō), and Hyang sō (Kyō sho); details of all these can best be seen from the chart. 50

The entrance to Tōgam p'o lies between Kyeju gak (Keishū kaku),

Charts 1258, 1256, 3480, 1262, 2347.

Charts 1270; 3642, plan of Gazan byochi and approaches.

a point situated close eastward of Samgil san, and the northern extremity of Ch'orak to (Soraku tō), situated about $1\frac{1}{2}$ miles east-north-eastward, but the navigable width is reduced to barely half a mile by the mud-bank which extends from Ch'orak to. The channel runs about $2\frac{1}{2}$ miles south-south-eastward from the entrance, with depths of from 5 to 9 fathoms (9^m1 to 16^m5), and then divides into two arms; the western arm continues southward for about 5 miles, becoming gradually shoaler until it ends in the mud flat; the eastern arm named Senui p'o (Sengi po), runs along the southern side of the mudbank extending from Ch'orak to for about $1\frac{1}{2}$ miles as far as Tangjinp'o-ri (Kaisō), where it divides into two, one branch running east-north-eastward for about one mile, and the other running south-eastward for about 2 miles.

Chart 3642, plan of Gazan byochi and approaches.

Asan myoji (Gazan byōchi), the anchorage in the next inlet eastward of Tōgam p'o is described on page 614.

Chart 1258.

APPROACH TO INCH'ŌN.—The approach to Inch'ōn (Chemulpho) (page 604) from seaward is bounded southward by the chain islets extending westward from Kwansu gak, described on page 591, and northward by the outer islands of Tōkchōk kundo, described below. From northward of An do (page 594) there are two channels of approach, Tong sudo (Higashi suidō) and So sudo (Nishi suidō); these two channels unite about 10 miles south-westward of Inch'ōn.

Tōkchōk kundo.—Tōkchōk kundo (Prince Imperial archipelago) is a large group of islands lying south-westward of Inch'ōn; most of these islands are barren and rocky, and only five of them are inhabited. See view A on chart 1258.

Moktōk to (Mogudeki), 197 feet (60^m0) high, is conical and lies at the south-western end of the group and nearly 21 miles north-westward of Kwansu gak; a rock, which dries 2 feet (0^m6), lies about 6 cables westward of this islet. A bank, with depths of from 7 to 10 fathoms (12^m8 to 18^m3) over it, extends about $4\frac{1}{2}$ miles south-westward from a position about $3\frac{1}{2}$ miles southward of Moktōk to (Lat. $36^{\circ}56' N.$, Long. $125^{\circ}47' E.$).

Kadōk (Biniimu) to, 239 feet (72^m8) high and covered with grass, lies about $2\frac{1}{2}$ miles north-eastward of Moktōk to; three rocky islets, the northern and highest of which is 90 feet (27^m4) high, lie close off its eastern side. Pan sō, a rock which dries 17 feet (5^m2), lies about $1\frac{1}{2}$ miles eastward of Kadōk to.

Toeryōng do (Pakuru), 127 feet (38^m7) high, lying about 3 miles west-north-westward of Kadōk to, is a rocky islet with a pointed rock on its summit. Soyōng, an islet 100 feet (30^m5) high, lies close westward of Toeryōng do.

Moktōk to, Kadōk to, and Toeryōng do are sometimes known collectively as Ferrières islands.

Ul to (Shopaiul), situated nearly 9 miles north-eastward of Kadōk to, has two peaks, the southern and higher being 705 feet (214^m9) high; a chain of four small islets extends about one mile north-eastward from its eastern point. The inhabitants of Ul to live on the northern side of the island. Paega do (Keunpaiul), an island 467 feet (142^m3) high, with several peaks, lies about 2 miles north-

Charts 1256, 3480, 1262, 2347.

Chart 1258.

westward of Ul to and is inhabited ; O do, an islet 360 feet (109^m7) high, lies close off the south-western point of Paega do. Chi do, 370 feet (112^m8) high, lies about 2½ miles northward of the eastern point of Ul to. The area enclosed by Ul to, Paega do, and Chi do contains many islets and rocks, the positions of which can best be seen from the chart ; among them is an islet 353 feet (107^m6) high. The tidal streams in this area are strong, and it should, therefore, be avoided.

Son'gap to (Seunchauptau) lies about 4 miles north-eastward of the eastern point of Ul to, and is covered with rocks and stones, with a few stunted trees ; it has several peaks, the highest being 1,147 feet (349^m6) high. Udo am, a rock which dries 23 feet (7^m0), lies about 1½ miles southward of Son'gap to. In 1926, the *Shinsei maru*, with a draught of 20 feet (6^m1), reported having touched bottom in a position about one mile northward of Son'gap to, but the existence of a danger here is doubtful.

Kurōp to (Obeto), 434 feet (132^m3) high, lies about 6 miles north-westward of Son'gap to, and there are several islets and numerous rocks between, the positions of which can best be seen on the chart ; among these are Kakhūl to (Kakkuri), 503 feet (153^m3) high, and Ka do (Kae to), 219 feet (75^m9) high.

Minōd'an, (Lat. 37° 07' N., Long. 125° 56' E.), a rock 7 feet (2^m1) high, lies nearly 4 miles south-south-westward of the south-western point of Kurōp to, and Hansom do (Saosan), a rocky islet 61 feet (18^m6) high, lies nearly 2½ miles westward of the same point. A bank, with depths of less than 5 fathoms (9^m1) over it, extends about 2 miles westward and 3 miles south-south-westward from Kurōp to. Small vessels passing through the area enclosed by Son'gap to, Kurōp to, and Paega do must exercise the utmost caution. A shoal, with depths of less than 3 fathoms (5^m5) over it, extends nearly 5 miles northward from a position about one mile westward of the northern point of Kurōp to.

Mun'gap (Munkabu) to, situated nearly 4 miles northward of Son'gap to, has a very prominent summit, 920 feet (280^m4) high, there are depths of less than 3 fathoms (5^m5) for one mile southward of the island. Mun'gap to is inhabited, the natives living at the head of a bay on the eastern side of the island. A bank, about 4 miles long in a north and south direction, which dries in patches and has depths of less than 3 fathoms (5^m5) over the remainder, lies about one mile westward of Mun'gap to ; this bank continues northward for about 3 miles with depths of less than 5 fathoms (9^m1) over it.

Charts 1270, 1258.

Tōkchōk to (Tokuseki tō or Takuchaku to), 1,017 feet (310^m0 high, the largest island of the group, lies with its southern extremity about 1½ miles northward of Mun'gap to, with shoal water between. Kam-jūngt'an, a rock which dries 19 feet (5^m8), lies about one mile northward of Mun'gap to, with a rock, with a depth of 1½ fathoms (2^m3) over it, midway between it and the south-western extremity of Tōkchōk to. Tant'an a rock 29 feet (8^m8) high, lies about half a mile off the western side of Tōkchōk to, about one mile from its northern extremity. There are several villages on Tōkchōk to. Sōnmi do (Chaoul) lies close off the northern extremity of Tōkchōk to and has two peaks, the north-western being 718 feet (218^m8) high. A bank, with depths of less than 3 fathoms (5^m5) over the greater part of it,

Charts 1256, 3480, 1262, 2347.

Charts 1270, 1258.

extends north-eastward from the north-eastern side of Tōkchōk to and connects with the bank which extends south-westward from Taemuñi do (Daibui tō) (page 602) ; this bank forms the north-western side of
 5 So sudo, and a spur from it extends to within about half a mile off Sōnmi do.

Chart 1270.

Mūk to (Boku tō) (*Lat. 37° 12' N., Long. 126° 08' E.*), 245 feet (74^m7) high, lies about 6 cables off the southern side of Tōkchōk to,
 10 on a bank which encumbers the channel between the latter island and Mun'gap to ; Mo do (Bo gan), 38 feet (11^m6) high, lies close off its eastern end. Soya do (tō), 503 feet (153^m3) high, is separated from the south-eastern side of Tōkchōk to by Tohang sudo, a channel about a quarter of a mile wide, except in one part, where it is almost
 15 blocked by rocky ledges extending from either side. There are several villages on Soya do, one of which, named Soya-ri, lies in the middle of the eastern coast. A rocky ledge, which dries entirely and has three small islets on it, extends about half a mile from the coast close northward of Soya-ri, giving complete protection from north-
 20 ward to fishing boats which assemble there during the season ; Such'ōng do (Susei tō), 84 feet (25^m6) high, lies at the outer end of this ledge. A shoal, with a least depth of 15 feet (4^m6) over it, lies within one mile north-eastward of Such'ōng do. Ung do, a rocky islet 31 feet (9^m4) high, is connected to the northern point of Soya do
 25 by a ledge which dries, and a rock, 103 feet (31^m4) high, lies about 3 cables south-eastward of it. The bank off the north-eastern side of Soya do joins the bank which extends north-eastward from Tōkchōk to. Chindut'a do (Jintōta tō), an islet 71 feet (21^m6) high, lies close off the southern point of Soya do ; a bank, with depths of from 13 feet
 30 to 5 fathoms (4^m0 to 9^m1) over it, extends about 2 miles south-westward from a position about 4 cables south-westward of this islet.

Chart 1258.

Lights.—Fog signal.—A light is exhibited, at an elevation of 208 feet (63^m4), from a white circular concrete tower, 25 feet (7^m6) in
 35 height, situated on Moktōk to. A fog signal is made from the lighthouse (*Lat. 36° 56' N., Long. 125° 47' E.*).

A light is exhibited, at an elevation of 526 feet (160^m3), from a white circular concrete structure, 31 feet (9^m4) in height, on the north-western extremity of Sōnmi do.

Chart 1270.

Tong sudo.—Islands and dangers.—Light-buoys.—Beacons.—An do with its light, situated on the south-western end of Changan t'oe, has been described on page 594. Some banks, with depths of less than 10 fathoms (18^m3) over them, lie from about 6½ to 8 miles north-
 45 eastward of An do, on the northern side of the usual track through Tong sudo. A can light-buoy, exhibiting a *white flashing light every five seconds*, is moored about one mile south-westward of the south-western end of the above banks. Changan sō (Chōan sho), situated about 9 miles north-eastward of An do, is a pinnacle rock which dries
 50 7 feet (2^m1) ; it is covered by a sector of *red* light from P'i do (Fu tō), situated about 5 miles north-eastward, between the bearings 026° and 035°. A can light buoy, painted red, and exhibiting a *white flashing light every fifteen seconds*, is moored about 2½ cables north-north-westward of Changan sō ; owing to the strong tidal streams

Charts 1256, 3480, 1262, 2347.

Chart 1270

this light-buoy is liable to drag. A rock, with a least depth of 28 feet (8^m5) over it, lies fully one mile north-westward of Changan sō ; the usual track through Tong sudo passes between them.

P'ung do (Hō tō), situated about 4½ miles east-north-eastward of Changan sō and on the eastern side of Tong sudo, has two peaks, the northern and higher being 571 feet (174^m0) high ; there is a village, with cultivated land around on the north-eastern side of the island. A sandbank, with depths of 10 fathoms (18^m3) and less over it, extends in two long tongues south-westward from P'ung do ; the southern tongue stretches to within 3 cables of Changan t'oe ; on the northern tongue there are depths of less than 5 fathoms (9^m1), with a 16-foot (4^m9) patch lying about 6 cables south-westward of the western point of P'ung do. A bank, which dries in parts, extends about 2½ miles eastward from P'ung do, to within about a quarter of a mile of the group of islets, including Yuk to (Roku tō), which are described on page 612. Sanggonggyōng do (Jōkōkei tō) and the other islands on the western side of Tong sudo are described on page 601.

P'i do (Fu tō) is an islet lying about 2½ miles north-westward of P'ung do ; P'iyōm sō, a rock which dries 9 feet (2^m7), lies about 4 cables eastward of P'i do, and between them is a rock which dries 3 feet (0^m9). The usual track through Tong sudo passes westward of this islet (*Lat.* 37° 09' N., *Long.* 126° 21' E.).

Sūngbong do (Shōhō tō), and the islands southward of it, which form the western side of the channel here, are described on page 601.

Chōk ch'o (Seki sho) is a small rock, 50 feet (15^m2) high, lying about 1½ miles north-eastward of P'i do. Ch'ang sō (Sō sho), lying about 1½ miles north-eastward of Chōk ch'o, is a conical islet, 198 feet (60^m3) high, lying on the extremity of the shoal, with depths of less than 6 fathoms (11^m0) over it, which extends south-westward from Yōnghūng do (Reikō tō), a large island described below ; T'ong sō (Tsu sho), a rock which dries 9 feet (2^m7), lies about 3 cables south-westward of Ch'ang sō.

T'ong sō (Tsū sho), a reef which dries 8 feet (2^m4), lies about 1½ miles west-north-westward of Ch'ang sō, and So ch'o (sho), a black rock 43 feet (13^m1) high, lies about a quarter of a mile northward of this reef. Ō do (Fū tō) consists of two flat-topped islets, 59 feet (18^m0) high, lying close together about one mile north-eastward of So ch'o. Ō do is the easternmost of a group of islets and drying reefs, known as Laguerre islands, which include Nam do (Nan shō), 131 feet (39^m9) high, and Hwang do (Kō tō), 127 feet (38^m7) high ; their positions can best be seen from the chart.

Paeg am (Haku gan), a rock 9 feet (2^m7) high, lies about 1½ miles north-eastward of Ō do ; two other rocks lie within a distance of 4 cables south-westward of Paeg am. A 5-fathom (9^m1) patch lies about midway between the outer of these rocks and Ō do. A shoal with a depth of 4 fathoms (7^m3) over it, was reported, in 1950, about half a mile eastward of Paeg am.

Sōbōl (Shoobatsu), consists of two small islands lying nearly in the middle of a bank, with depths of less than 3 fathoms (5^m5) over it, which extends southward almost to Ō do ; the eastern island is 232 feet (70^m7) high and lies about three-quarters of a mile north-westward of Paeg am.

Yōnghūng do (Reikō tō) lies on the eastern side of Tong sudo, with

Charts 1258, 1256, 3480, 1262, 2347.

Chart 1270.

its south-western extremity about $1\frac{1}{2}$ miles eastward of Paeg am ; mudbanks, which dry, extend from all its coasts. Kapchuk to (Kōchiku to) (*Lat.* $37^{\circ} 12' N.$, *Long.* $126^{\circ} 27' E.$) a rock 56 feet (17^m1) high, 5 lies on the extremity of the mudbank which extends about one mile south-south-westward from the southern point of the island ; there are depths of less than 3 fathoms (5^m5) for a distance of fully one mile southward of Kapchuk to. Kuksa bong (Kokushi hō), 515 feet (157^m0) high, the summit of Yōnghūng do, is situated in the northern 10 part of the island, and has a prominent clump of trees on it, which forms a useful mark for Tong sudo ; Tongam san (Dogan zan), 498 feet (151^m8) high, is situated nearly $1\frac{1}{2}$ miles south-westward of Kuksa bong and terminates westward in a headland named Muk do, which is the western extremity of this island.

15 Two leading beacons, about 5 cables apart, stand on the south-western side of Yōnghūng do ; each consists of a post with an orange-coloured triangular daymark, on a white base, 24 feet (7^m3) in height. T'ogu sō (Toko sho), 6 feet (1^m8) high, and several other rocks, lie on the mud bank extending from the northern side of 20 Yōnghūng do. Chu sō (Sui sho), a rock which dries 6 feet (1^m8), lies nearly $1\frac{1}{2}$ miles north-eastward of T'ogu sō and on the northern edge of a shoal with a depth of less than 3 fathoms (5^m5) over it ; a rock, which dries 9 feet (2^m7), lies about $1\frac{1}{2}$ cables westward of Chu sō. Near the fairway westward of Chu sō the depths are 25 irregular, and overfalls occur.

Namjangja sō (Minamichōshi sho) a rock 5 feet (1^m5) high, lies about 2 miles north-eastward of T'ogu sō. Pukchangja sō (Kitachōshi sho) lies about one mile northward of Namjangja sō and is a similar rock.

30 P'almi do (Hachibi tō) is an islet lying on the western side of the fairway and about $2\frac{1}{2}$ miles north-eastward of Pukchangja sō. A rock, which dries 16 feet (4^m9), lies about $3\frac{1}{2}$ cables westward of P'almi do, and a rock, which dries 14 feet (4^m3), lies about one cable westward of the north-western point of this islet ; a rocky islet lies 35 close off the north-eastern point, and nearly half a mile north-eastward of this point is a rock with a depth of one foot (0^m3) over it. A sandbank, a large portion of which dries and which has depths of less than 3 fathoms (5^m5) over the remainder, extends nearly 4 miles north-eastward from a position about $1\frac{1}{2}$ miles westward of 40 P'almi do.

Chart 3642, plan of Inch'ön hang ; Chart 1270.

The channel leading to Inch'ön narrows to little more than one mile between the banks on either side about 4 miles north-eastward of Palmi do, and its western side is marked by a light-buoy, painted black 45 and exhibiting a *white flashing light every six seconds*. A bank, with a least depth of 34 feet (10^m4) over it, lies near mid-channel about $3\frac{1}{2}$ miles north-eastward of Palmi do (*Lat.* $37^{\circ} 21' N.$, *Long.* $126^{\circ} 31' E.$) and there are other banks, with least depths of 33 feet (10^m1) over them, between the light-buoy and Inch'ön hang, the positions of 50 which can best be seen from the charts.

The directions for the channel leading to Inch'ön are given on page 608

Chart 1270.

Lights.—Fog signals.—Storm signals.—A light is exhibited, at an

Charts 1258, 1256, 3480, 1262, 2347.

Chart 1270.

elevation of 120 feet (36^m7), from a white circular stone tower, 49 feet (14^m9) in height, situated on P'i do. An auxiliary light, which shows over a small sector covering Changan sō, is exhibited from the same lighthouse below the main light. A fog signal is occasionally sounded from the lighthouse. Storm signals are displayed; *see* page 28. 5

A light is exhibited at an elevation of 45 feet (13^m7), from a black hexagonal stone tower, 18 feet (5^m5) in height, situated on Paeg am. Owing to the dark background, when approaching from the southward, the lighthouse does not show up well by day. 10

A light is exhibited, at an elevation of 45 feet (13^m7), from a red circular stone tower, 18 feet (5^m5) in height, situated on Pukchangja sō.

A light is exhibited, at an elevation of 219 feet (66^m7), from a white circular concrete tower, 32 feet (9^m8) in height, situated on P'almi do. Storm signals are displayed from this lighthouse; *see* page 28. 15

Islands and dangers between Tong sudo and So sudo.—Middle ground, with depths of less than 10 fathoms (18^m3) over it, and a least depth of 34 feet (10^m4), extends about 3 miles north-eastward from a position about 6 miles northward of An do (page 594). 20

Hagonggyōng do (Kakōkei tō), 161 feet (49^m1) high, lies nearly 2½ miles south-westward of P'i do (page 599) and on the western side of Tong sudo; a rock, which dries 5 feet (1^m5), lies about 2 cables eastward of Hagonggyōng do: Sanggonggyōng do (Jōkōkei tō), 224 feet (68^m3) high, lies close northward of Hagonggyōng do; these two islands lie together on a shoal which extends about one mile south-westward of Sanggonggyōng do. 25

Sūngbong do (Shōhō tō) lies with Taesamsi (Daisanji) its eastern extremity, nearly 1½ miles north-westward of P'i do; the summit of the island, is 329 feet (100^m3) high and has some large pine trees on it, which form a good landmark. Yōng do (Kon tō), 183 feet (55^m8) high, lies about 3 cables southward of the south-eastern end of Sūngbong do, with some rocks between. A 16-foot (4^m9) patch lies about half a mile north-north-eastward of Taesamsi, and a narrow shoal bank, which partially dries, extends about 2 miles northward from a position about a quarter of a mile further northward. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about one mile northward from the northern side of Sūngbong do; Haejon sō (*Lat.* 37° 11' N., *Long.* 126° 18' E.), a rock which dries 14 feet (4^m3), lies on the north-western part of this bank. 40

Soijak to (Shōisaku tō), 608 feet (185^m3) high, lies westward of Sūngbong do, and is separated from it by a narrow strait in which are several rocks; Kyenamni do (Keinanri tō), the south-eastern extremity of Soijak to, is connected to the main island by a narrow strip of sand. There is a village at the head of a bay on the north-western side of Soijak to. 45

Sasūngbong do (Sha tō), 234 feet (71^m3) high, lies about half a mile southward of Kyenamni do and its western side is nearly joined to Habōl ch'ōnt'oe (Kabatsu sentai), a large bank which dries, separated from Soijak to by a narrow but deep channel. Pōl sō (Batsu sho) lies close westward of Sasūngbong do, and Hu sō (Go sho), 3 feet (0^m9) high, lies about 6 cables south-westward of the southern point of the latter island. The 3-fathom (5^m5) line surrounding Habōl ch'ōnt'oe extends about 4 miles south-westward from Soijak to. 50

Charts 1258, 1256, 3480, 1262, 2347.

Chart 1270.

Taeijak to (Daiisaku tō), 512 feet (156^m1) high, lies close westward of Soijak tō, with an islet, 83 feet (25^m3) high, between; a rock, which dries 19 feet (5^m8), lies off the eastern entrance to the channel between these two islands. Pōran do (Batsuan tō) is almost connected to the western extremity of Taeijak to. Pōl to (Batsu tō), 135 feet (41^m1) high, lies about 2 cables north-westward of Pōran do, and a rock, which dries 17 feet (5^m2), lies off the north-eastern entrance of the channel between. Chu sō (Sui sho), a rock which dries 9 feet (2^m8), lies about 2 cables northward of Pōl to. Tongbaek to (Dōhaku tō), a small islet lying about a quarter of a mile north-north-westward of Pōl to, is 80 feet (24^m4) high and a useful mark for the navigation of So sudo. A bank, with depths of from 25 feet to 10 fathoms (7^m6 to 18^m3) over it, extends about 4 miles south-westward from a position about half a mile south-south-westward of Pōl to. Shoals, with depths of less than 3 fathoms (5^m5) over them, lie nearly one mile northward of Taeijak to and Soijak to.

Chawōl to (Shigetsu tō) lies with its western extremity about 5½ miles north-eastward of Pōl to; Hūksō bong (Kokushi hō), the summit of the island, is 562 feet (171^m3) high and situated near its centre. Ko do (Kō tō), an islet 49 feet (14^m9) high, lies about one mile south-eastward of Hūksō bong and a quarter of a mile offshore; Chang sō (Shō sho) lies about 6 cables southward of Ko do, and dries 14 feet (4^m3). A rock, which dries 19 feet (5^m8), lies about 7 cables west-south-westward of Ko do. Hwang sō (Kō sho) lies about 1½ miles south-eastward of Ko do, and dries 27 feet (8^m2). Kan sō (sho), a reef which dries, lies with its northern extremity about 1½ miles south-south-westward of Ko do; there are depths of less than 3 fathoms (5^m5) for fully one mile westward of this reef. Shoals extend south-westward from Chawōl to to within about 1½ miles of Taeijak to and bound the south-eastern side of So sudo; details of these can best be seen from the chart. Muk't'ong do (Bokuyo tō), is a small islet, 57 feet (17^m4) high, lying about 4 cables west-north-westward of the north-western point of Chawōl to, with foul ground between. Shoals, which dry in places, extend about 6½ miles north-eastward from Chawōl to, and bound the south-eastern side of So sudo.

So sudo.—Islands and dangers.—Light-buoy.—So sudo (Nishi suidō) is entered eastward of Son'gap to (chart 1258), described on page 597, and the channel then leads between Soya do (page 598) and Tongbaek to, and north-westward of Muk't'ong do.

Ch'och'i kundo (Sōji guntō) is a group of three islets lying in the middle of the bank which connects Tōkchōk to and Taemuūi do (page 598). Soch'och'i do (Shōsōji tō), the southernmost islet, is 165 feet (50^m3) high and lies nearly 2½ miles northward of Muk't'ong do. Taech'och'i do (Daisōji tō) is 162 feet (49^m4) high and lies about half a mile north-north-westward of Soch'och'i do, and the third islet, 126 feet (38^m4) high, lies close off the south-western end of Taech'och'i do. Ch'och'i am (Sōji gan), a rock which dries 19 feet (5^m8), lies nearly 2 miles westward of Taech'och'i do (*Lat. 37° 20' N., Long. 126° 16' E.*). A can light-buoy, painted red, and exhibiting a *white flashing light every five seconds*, is moored nearly 2 miles south-south-westward of Ch'och'i am.

Taemuūi do (Daibui tō), 800 feet (243^m8) high, lies about 7½ miles north-eastward of Soch'och'i do; it has two peaks, with low land

Charts 1258, 1256, 3480, 1262, 2347.

Chart 1270.

between, and from a distance appears as two islands. Taemuŭi do is the south-western of the principal islands of Marie Fortunée archipelago, which is described below. The coast of the island consists mainly of sandy beaches and cliffs; on the southern side there are low cliffs of a reddish colour. Banks of sand and mud, which dry, extend for about 3 miles on the western side, and 2 miles on the eastern side. Silmi do, an islet 161 feet (49^m1) high, lies about 2 cables off the north-western coast of Taemuŭi do and on the edge of the mud bank which dries; Sangyŏp to (Sŏyŏ tŏ), 163 feet (49^m7) high, with a few pine trees on it, lies on the mud bank which extends from the eastern side of the island, and two rocks above water and a drying rock lie about half a mile northward of it. Somuŭi do (Shŏbui tŏ), 230 feet (70^m1) high, lies close off the south-eastern side of Taemuŭi do, and several rocks lie within 3 cables of the south-eastern point of this islet. Haeri do (Kairi tŏ) (*Lat.* 37° 22' N., *Long.* 126° 27' E.) is a conical islet, 130 feet (39^m6) high, lying about half a mile southward of Somuŭi do; a 16-foot (4^m9) patch lies about half a mile south-westward of Haeri do. Less water was reported, in 1954, near the centre of the fairway of So sudo, in a position about 2½ miles south-westward of the south-western point of Taemuŭi do.

Marie Fortunée archipelago.—Marie Fortunée archipelago consists of a group of islands and rocks lying on the western side of the approach to Inch'ŏn. Taemuŭi do, the south-western of the five principal islands, has been described above. Yongyu do (Ryŭyŭ tŏ) lies on a mud flat, which dries, with its southern extremity nearly three-quarters of a mile north-eastward of the northern extremity of Taemuŭi do, and between the two is Chamjin do (Sanshin tŏ), an islet 171 feet (52^m1) high. Hwanak (Kansŏri) san, 564 feet (171^m9) high, the summit of Yongyu do, is situated in the southern part of the island; Hyanggok (Kŏkoku) san, 463 feet (141^m1) high, is a peak on the north-western extremity of Yongyu do, and Taedang (Daidŏ) san, 416 feet (126^m8) high, with a prominent group of trees on it, lies about 1½ miles south-south-eastward of Hyanggok san.

Yŏngjŏng do (Eisŏ tŏ), the largest island in the group, lies with its south-western extremity about 3 miles north-eastward of the eastern point of Yongyu do. Paegun san (Hakuun zan), its summit, on which is a prominent clump of trees, is 850 feet (259^m1) high and situated in about the centre of the island. The coasts are mostly mud or embankments, and there are salt pans along the southern coast; there is a considerable amount of cultivation, and there are numerous villages. Sinbul to (Shimbitsu tŏ), 430 feet (131^m1) high, lies about 4 cables south-westward of the south-western extremity of Yŏngjŏng do, and has two summits of a pale yellow colour and of about the same elevation. Sammok to (Sammoku tŏ), 463 feet (141^m1) high, lies about 4 cables off the western coast of Yŏngjŏng do, and has a group of trees on its summit. These three islands lie on an extensive mudbank which dries, and which forms the western side of Inch'ŏn hang (Chemulpho harbour) and its approach. This bank is only separated from the banks surrounding Taemuŭi do and Yongyu do by narrow channels.

Charts 1270, 1258.

Tidal streams.—In the area westward of a line through Kyong-nyŏlbi yŏlto, Tŏkchŏk kundo, and Yŏnp'yŏng yŏlto (Yonpyon islands

Charts 1256, 3480, 1262, 2347.

Charts 1270, 1258.

(page 624), and eastward of a line drawn southward from Sunwi do Suni tō) (page 629), the tidal streams are rotatory, turning round against the hands of a clock in 12 hours. That is, at the time of low
 5 water at Inch'ōn the direction is between south and south-east, 3 hours after low water between east and north-east, at high water between north and north-west, and 3 hours after high water between west and south-west. The lowest rate occurs about the time of high and low water, and the maximum rate about 3 hours after high and
 10 low water.

Between Kurōp to and Ul to (page 596), and in that vicinity, there is a certain amount of variation according to the configuration of the land, but in general the tidal streams set north-eastward and south-westward, turning about the times of high and low water ;
 15 the maximum rate may exceed 2 knots.

About 3 miles northward of Sōnmi do (page 597) the maximum rate of the north-east-going stream is about $2\frac{1}{2}$ knots, and that of the south-west-going stream about $3\frac{1}{2}$ knots ; the streams here turn at about the times of high and low water.

20 In Tong sudo and So sudo the tidal streams in general run north-eastward and south-westward, turning at about the times of high and low water at Inch'ōn. From observations made at spring tides, the streams attain a rate of about $4\frac{1}{2}$ knots about 4 miles eastward of I tō, nearly $4\frac{1}{2}$ knots between Soya do and Tongbaek to, $2\frac{1}{2}$ knots
 25 about 2 miles north-westward of Chawōl to, $2\frac{1}{2}$ knots from 5 to 6 miles south-westward of Hagonggyong do, 4 knots between Sūngbong do and P'ung do, and 3 knots off the western coast of Yōnghūng do. In the narrow part of So sudo, however, the streams may attain a rate of $6\frac{1}{2}$ knots at times. Between Taemuñi do and Yōnghūng do
 30 the tidal streams run eastward and westward, turning at about the times of high and low water at Inch'ōn, and attaining a rate of 3 knots.

About $3\frac{1}{2}$ miles south-westward of Taech'och'i do (*Lat.* $37^{\circ} 20' N.$, *Long.* $126^{\circ} 16' E.$) the tidal streams turn through 360° in about 12
 35 hours ; from observations made at spring tides, at low water at Inch'ūn the stream runs south-south-east with a rate of half a knot ; 3 hours after low water, north-east at $1\frac{1}{2}$ knots ; at high water, north-north-west at three-quarters of a knot ; 3 hours after high water, west-south-west at $1\frac{1}{2}$ knots. About one mile north-eastward
 40 of Taech'och'i do the tidal streams run north-eastward and south-westward, turning at about the times of high and low water at Inch'ōn and attaining a rate of $1\frac{1}{2}$ knots.

Chart 3642, plan of Inch'ōn hang.

INCH'ŌN HANG.—**General remarks.**—Inch'ōn hang, formerly
 45 called Chemulpho harbour, is situated at the mouth of Yōm ha (En ka), which is a southern branch of Han gang (page 612) ; the western side of the harbour is bounded by the mud flats which extend from the southern side of Yōngjōng do, and the eastern side by those extending from the mainland. Inch'ōn is the port of Kyōngsōng or
 50 Seoul, the capital of South Korea, situated some 15 miles inland. It is a natural harbour, well protected by islands and free from ice ; its one disadvantage is the large rise and fall of the tide, over 30 feet (9^m1) at spring tides.

Charts 1256, 3480, 1262, 2347.

Chart 3642, plan of Inch'ŏn hang.

Inch'ŏn hang is divided into two portions by Wŏlmi do and Sowŏlmi do, which are described below, the part eastward of these islands being the inner harbour. The harbour limit is a circle with its centre at the lighthouse on Sowŏlmi do, and a radius of 2 miles. 5 This limit is indicated by a pecked line on the chart. The city of Inch'ŏn had a population of about 300,000 in 1950.

Islands and coast in the vicinity of the harbour.—Wŏlmi do, 338 feet (103^m0) high, situated on the mud flat off the city of Inch'ŏn, rises gradually to its summit in the centre of the island, on which is a 10 signal tower; the western side is not so steep as the eastern. Wŏlmi do is connected to Inch'ŏn by a causeway carrying a road. The Quarantine station is situated on the south-western extremity of the island, and there are two jetties here. Two disused radio masts stand on the south-eastern side of the summit. Sowŏlmi do lies 15 about half a mile southward of Wŏlmi do and is connected to it by a mud flat, which dries, and by an embankment. There is a water-police station, with a flagstaff, near the southern end of the island. Sowŏlmi do is surrounded by a sea wall; close north-westward of the southern corner of this wall a series of horizontal lines, one foot 20 (0^m3) apart, are marked on the wall, every fifth line being numbered to show its height in feet above datum level; there is a similar series of lines close east-north-eastward of the corner.

Wŏn do (*Lat.* 37° 27' N., *Long.* 126° 38' E.), 79 feet (24^m1) high is situated about 1½ miles east-south-eastward of Sowŏlmi do; this 25 islet is now the corner of land which has been reclaimed from the mudbank which dries. Sowŏn do lies close south-westward of Wŏn do and has two rocky summits, 56 and 62 feet (17^m1 and 18^m9) high, respectively. Tok am, a headland 59 feet (18^m0) high, situated nearly 1½ miles southward of Wŏn do, is sparsely wooded with pine 30 trees.

Nearly 1½ miles north-westward of the northern extremity of Wŏlmi do, is an inhabited island of yellow sand, 111 feet (33^m8) high, lying on the edge of the bank extending from Yŏngjŏng do, which is connected to that island by a stone causeway; it is fringed by rocks, 35 and there is a row of pine trees on its summit. Hwasan got is the southern point of this island, and Kuup is a village on its northern side. Tongnae san, 92 feet (28^m0) high, lies about 6 cables south-westward of Hwasan got. Chagyak to, 128 feet (39^m0) high, lies about 4 cables north-eastward of the island just described, and is 40 easily identified, as it is more densely wooded than other places in the neighbourhood; it lies on the southern part of a mudbank, which dries, and which extends for nearly half a mile from its northern side. A rocky ledge extends about one cable from the eastern side of Chagyak to. 45

Turibong got is a point on Yŏngjŏng do situated about half a mile north-westward of Chagyak to.

Yul to, 184 feet (56^m1) high, lies with its western extremity nearly 1½ miles north-eastward of Chagyak to and on the bank, which dries, on the eastern side of the river; it is a hilly island, and has a prominent 50 group of trees on its summit. Hang do, 88 feet (25^m8) high, which is sparsely covered with grass, lies close off the western extremity of Yul to, and is connected to it by a reef which dries. Pokki is the southern point of Yul to.

Charts 1270, 1258, 1256, 1262, 2347.

Chart 3642, plan of Inch'ōn hang.

Dangers in the outer harbour and in the river northward.—The general depths in the outer harbour vary between 4 and 9 fathoms (7^m3 and 16^m5), and there is sufficient space for several large vessels to lie at anchor there.

A pinnacle rock, with a depth of 12 feet (3^m7) over it, lies nearly one mile south-south-westward of Sowōlmi do (*Lat.* 37° 28' N., *Long.* 126° 36' E.). A shoal, with a least depth of 9 feet (2^m7) over it, lies about half a mile westward of Sowōlmi do, and Koreietz rock, 10 with a depth of 7 feet (2^m1) over it, lies about half a mile north-westward of the same island; a shoal, with a depth of 16 feet (4^m9) over it, lies about 3 cables north-westward of Sowōlmi do, and within 3 cables further north-westward are three rocks with depths of from 15 to 18 feet (4^m6 to 5^m5) over them. A rock, with a depth of 18 15 feet (5^m5) over it, lies about 2 cables north-westward of the western extremity of Wōlmi do.

A rocky shoal, with a least depth of 30 feet (9^m1) over it, lies about 4 cables westward of Wōlmi do; about a quarter of a mile north-westward of this shoal is another rocky shoal, with a least 20 depth of 4 fathoms (7^m3) over it.

Sōdu am lies about a quarter of a mile north-westward of the northern extremity of Wōlmi do and partly dries; tide-rips occur over its western part.

Shoals, with depths of less than 6 fathoms (11^m0) over them, lie 25 near mid-channel eastward and south-eastward of Chagyak to, and include a depth of 22 feet (6^m7).

Lights.—Fog signal.—Buoyage.—Three lights, vertically disposed, are exhibited, at an elevation of 95 feet (28^m7) from a white circular stone tower, 42 feet (12^m8) in height, situated on Sowōlmi do (*Lat.* 30 37° 28' N., *Long.* 126° 36' E.). A fog signal is sounded near the lighthouse.

A light-buoy, painted red, and exhibiting a *red flashing* light is moored about one cable north-westward of Koreietz rock, which is also marked by a white and a red and black buoy.

35 A light-buoy, No. 1, painted red, and exhibiting a *white flashing* light *every three seconds*, marks the 12-foot (3^m7) rock lying nearly one mile south-south-westward of Sowōlmi do. A light-buoy, painted red and exhibiting a *white flashing* light, is moored close north-eastward of No. 1 light-buoy. A light-buoy, No. 2, painted red, and 40 exhibiting a *white group flashing* light, giving two flashes *every six seconds*, is moored off the end of the groyne extension to the breakwater on the southern side of the entrance to the inner harbour. A light-buoy, painted black and exhibiting a *white flashing* light, is moored about 3½ cables south-westward of Sowōlmi do.

45 A light, the position of which is approximate, is exhibited at an elevation of 52 feet (15^m8), from a red, circular, concrete structure on Sōdu am.

A light is exhibited on the eastern side of Chagyak to.

It was reported in 1950, that all light-buoys at Inch'ōn were 50 extinguished.

Anchorage.—**Tidal streams.**—There is secure anchorage, with good holding ground, south-westward of Wōlmi do, and vessels which are too large to enter the inner harbour can work cargo here. The best position is with Sowōlmi-do lighthouse bearing 050°, distant

Charts 1270, 1258, 1256, 1262, 2347.

Chart 3642, plan of Inch'ŏn hang.

not less than 6 cables, in a depth of about $6\frac{1}{2}$ fathoms (11^m9); within this distance there are some scattered iron plates of a sunken vessel, which should be avoided. A strong southerly wind raises a sea, and it is then difficult to work cargo. The tidal streams have a maximum 5
rate of about 3 knots at springs.

Tidal streams.—In the river estuary (outer harbour), while the tide is rising the stream sets northward towards the western extremity of Wōlmi do from about half an hour after low water to about half 10
an hour after high water. The south-going stream runs the rest of the time. Both streams have a maximum rate of about $3\frac{1}{2}$ knots, and the rate is less than a quarter of a knot for about a quarter of an hour at each turn.

Inner harbour.—Tidal basin.—Beacon.—Tidal streams.—The inner harbour lies eastward of Wōlmi do and Sowōlmi do, and is bounded 15
southward by a breakwater, with a groyne extension, extending to a position about half a mile south-westward of Sowōlmi do; the outer end of the breakwater is marked by a beacon. The greater part of the inner harbour dries, leaving only a narrow channel leading to a tidal basin at the head; dredging is undertaken to maintain a 20
depth of about 13 feet (4^m0) over a width of about half a cable on the leading line through this channel, and is also in an area westward of the entrance to the tidal basin. It was reported, in 1950, that the depths in the fairway are unreliable owing to constant silting and ineffective and infrequent dredging. The least depth in the channel 25
was only 4 feet (1^m2), in 1951.

The tidal streams in the inner harbour are weak, not exceeding one knot.

The tidal basin is 1,430 feet (435^m9) long and 650 feet (198^m1) wide, and has a maximum depth of 28 feet (8^m5). The entrance lock is 30
462 feet (140^m1) long and 60 feet (18^m3) wide, and will accommodate vessels up to 350 feet (106^m7) in length. Vessels of greater length can be admitted at high water. There is a signal station on the northern side of the entrance to the lock.

A second, and larger basin is under construction further southward 35
as indicated on the chart.

Several piers, for lighters and small vessels, extend from the shore north-westward of the tidal basin.

There are a number of wrecks and obstructions in the inner harbour.

Lights. — Light-buoys.—Leading lights are exhibited at the 40
western end of the city of Inch'ŏn. The front light is exhibited, at an elevation of 45 feet (13^m7), from a white square iron framework tower, 41 feet (12^m5) in height, situated nearly one mile north-eastward of Sowōlmi do; the rear light is exhibited, at an elevation of 153 feet (46^m6), from a white square iron framework tower, 75 feet 45
(22^m9) in height, situated nearly $2\frac{1}{2}$ cables north-eastward of the front light. These two lights in line, bearing 041° , lead through the fairway of the Inner harbour channel.

Lights are exhibited from the heads of two piers situated near the front leading light. 50

A light-buoy, painted red and exhibiting a *red occulting* light is moored about 3 cables south-westward of Sowōlmi do (*Lat.* $37^\circ 28' N.$, *Long.* $126^\circ 36' E.$).

A light-buoy, painted red and exhibiting a *red flashing* light, is

Charts 1270, 1258, 1256, 1262, 2347.

Chart 3642, plan of Inch'ön hang.

moored on the south-eastern side of the entrance channel about one cable south-eastward of Sowölmi do. A light-buoy, No. 3, painted red, and exhibiting a *red flashing light every three seconds*, is
 5 moored about 4 cables north-eastward of Sowölmi do (*Lat. 37° 28' N., Long. 126° 36' E.*) and on the south-eastern side of the entrance channel. A light-buoy, No. 4, painted black, and exhibiting a *white flashing light every three seconds*, is moored about 6 cables north-eastward of Sowölmi do and on the north-western side of the entrance
 10 channel.

It was reported, in 1950, that all light-buoys at Inch'ön were extinguished.

Charts 1270, 1258.

Directions.—A vessel of deep draught making for Inch'ön may
 15 use either Tong sudo (page 598) or So sudo (page 602), but owing to the numerous dangers and the strong tidal streams, caution is necessary. Tong sudo is the channel usually taken, and it can be navigated at night; although it has more dangers in it than So sudo, the tidal streams are not so strong and never exceed 4 knots.
 20 Small vessels with local knowledge, approaching from north-westward, sometimes enter So sudo by crossing the bank between Tökchök to and Ch'och'i kundo in a position about 3 miles south-westward of the latter; *see* page 602.

Approaching either Tong sudo or So sudo, a vessel from southward
 25 should proceed through the channel westward of Ong do (page 590), or pass westward and northward of Kyongnyölbi yölto (page 591), and should then shape course to pass about $1\frac{1}{2}$ miles north-westward of An do (page 594). A vessel from northward or north-westward should pass southward of Mektök to (page 596) and then steer an
 30 east-north-easterly course for Changan sō (page 598).

Chart 1270.

Tong sudo.—From a position about $1\frac{1}{2}$ miles north-westward of An do, a north-easterly course should be steered direct for Changan sō, and when about 5 miles north-westward of Hwanggūm do (page
 35 594) the group of trees on Kuksa bong, the summit of Yōnghūng do (page 600), will be seen in line with the lighthouse on P'i do (page 599), bearing 038° (*see* view facing page 609); this mark should be steered for, passing between Changan-sō light-buoy and the 28-foot (8^m5) patch lying about one mile north-westward of this rock. It
 40 has been reported that Kuksa bong is liable to be obscured by haze at any time of the year. When the summit of Sanggonggyōng do bears 310°, course should be shaped to pass between P'i do and Yōng do and, when through this channel, steer with the beacons on the south-western side of Yōnghūng do in line ahead, bearing about 038°,
 45 and with P'i-do lighthouse astern, bearing 218°. When south-eastward of Paeg-am lighthouse steer a northerly course so as to pass between Paeg am and the 4-fathom (7^m3) shoal situated about half a mile eastward of it, and when P'almi-do lighthouse is in line with Pukchangja-sō lighthouse, bearing about 043°, shape course to pass
 50 about half a mile north-westward of the latter and thence steer to pass about half a mile southward of P'almi do.

Charts 3642, plan of Inch'ön hang, and 1270.

From the position about half a mile southward of P'almi do steer 034°, and a useful mark for this purpose is a prominent tall white

Charts 1256, 3480, 1262, 2347.

To face page 649.

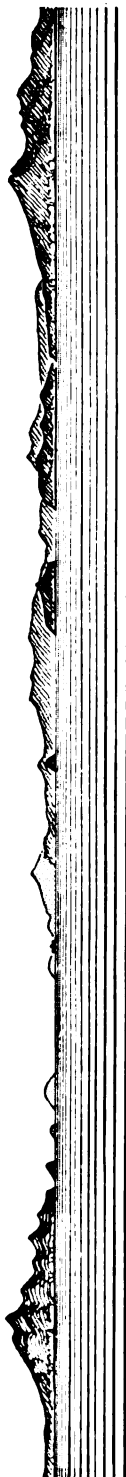
APPROACHES TO INCH'ŌN



Summit of Yongking do (Reiko tô) in line with Pi do (Fu tô), bearing 038°.

Leading mark for Tong sudo (Higashi suidô).
(Original dated 1934).

Chavril to.



Tongback to
290-foot high hill on Chavril to (Shigetsu tô) in line with Tongback to (Dôhaku tô), bearing 043°.

Soya do (tô).

Sônmi do (Chavril).



Tach'ochi do
(Daisôji tô).

S. extremity of Sock'ock'i do
Peak on northern extremity of Tôchûk to (Tôchûk to) in line with southern extremity of Sock'ock'i do (Shôsôji tô), bearing 253°.

Two views of the leading marks for So sudo (Nishi suidô).
(Originals dated 1884).

Charts 3642, plan of Inch'ŏn hang, and 1270.

house with a square tower and a red roof, situated on a 289-foot (88^m1) hill about 1½ cables north-eastward of Inch'ŏn rear leading light; the observatory (*Lat. 37° 28' S., Long. 126° 38' E.*) is situated nearly 2 cables north-eastward of this house, but is on a lower hill, and it is stated that it cannot be identified from seaward. Continue on this course until the group of trees on the summit of Yul to bears 021°, when keep it so, which leads to the anchorage.

The track described above is indicated by pecked lines on chart 1270.

The season of fog is during May and June, and fog may always be expected outside Inch'ŏn before and after sunrise; the afternoon is the best time for going in. The bottom between P'i do and Paeg am is foul, and it would be dangerous to anchor there in fog.

Between Yŏnghŭng do and Pukchangja sŏ vessels are liable to be set eastward by the tidal stream during the rising tide, and westward during the falling tide, the effect of the latter being the stronger of the two.

Chart 1270.

Near Changan sŏ the tidal streams set across the track shown on the chart, and fog is liable to come on suddenly; the red sector of P'i do lighthouse is weak, and at night vessels may be unexpectedly close to Changan sŏ before this light is sighted; for these reasons it is reported that the pilots do not follow the charted track after embarking at An do, but pass north-westward of the 28-foot (8^m5) patch lying about one mile north-westward of Changan sŏ, and then pass between this patch and Hagonggyong do. Provided that Changan-sŏ light-buoy is in position, however, there should be no difficulty in following this track.

Charts 1270, 1258.

So sudo.—A vessel intending to pass through So sudo should make for a position about 3 miles south-eastward of Ul to (page 596), and then steer a north-easterly course until the summit of Mungap to is in line with the eastern extremity of Sŏn'gap to, bearing about 003°, when the summit of Soya do should be steered for, bearing 017°, which leads about 1½ miles eastward of Udo am.

When the 290-foot (88^m4) high peak on the western end of Chawŏl to is in line with Tongbaek to, bearing 043° (*see view facing this page*) steer for them until within about 1½ miles of Tongbaek to, when steer for the western extremity of Soch'och'i do, bearing 026°, which leads in mid-channel between Tongbaek to and Soya do; the tidal streams here are very strong, sometimes attaining a rate of 5 knots. Continue on this last course until Mukt'ong do bears 084°, distant about 1½ miles, when course should be altered to 051° so as to pass about one mile south-eastward of Soch'och'i do. When the peak on the northern extremity of Tŏkchŏk to is in line with the southern extremity of Soch'och'i do, bearing 253° (*see view facing this page*), keep this mark on astern, which leads between the banks extending north-eastward from Chawŏl to and that connecting Ch'och'i kundo and Taemuŭi do. When the western extremity of Taemuŭi do bears 006°, course should be altered for a position about half a mile southward of P'almi do, thence vessels should follow the directions given for Tong sudo.

The track described above is indicated by pecked lines on chart 1270; less water was reported in its vicinity, in 1954, about 2½ miles south-westward of the south-western point of Taemuŭi do.

Charts 1256, 3480, 1262, 2347.

Chart 3642, plan of Inch'ŏn hang.

Winds and Weather.—Except during the summer, the prevailing winds at Inch'ŏn are northerly. Between May and July they are predominantly south-westerly.

5 **Fog** occurs with the greatest frequency between April and August, and is specially prevalent during June and July. On the average there are forty days with fog throughout the year.

Tidal streams.—In the estuary of Yŏm ha the flood-stream sets northward in the direction of Wŏlmi do, and the ebb takes the
10 opposite direction. The maximum rate is about $3\frac{1}{2}$ knots. The turn occurs about half an hour after high and low water.

Pilotage.—Regulations.—Pilotage is optional. One pilot is available on 24-hours notice. The pilot normally boards vessels in the vicinity of P'almi do (*Lat. 37° 21' N., Long. 126° 31' E.*), but will
15 board at An do if requested.

Vessels proceeding from the outer harbour to the tidal basin will be furnished with a pilot.

Vessels approaching Inch'ŏn must radio to the Port Commander their position and estimated time of arrival 100 hours and again 48
20 hours before arrival. If the estimated time of arrival changes more than one hour from the second report, it must be reported again 24 hours before arrival. Berths are assigned by radio.

Dredger signals.—Under normal conditions, the dredger working in the channel of the inner harbour will exhibit the following signals:—

25	<i>Day signal.</i>	<i>Night signal.</i>	<i>Signification.</i>
	A red flag.	Two red lights, disposed vertically below her anchor lights.	Incoming vessels must keep the dredger on their starboard hand; outgoing vessels must keep the dredger on their port hand.
30			
	A white flag.	Two green lights, disposed vertically below her anchor light.	Incoming vessels must keep the dredger on their port hand; outgoing vessels must keep the dredger on their starboard hand.
35			

Dock signals.—Under normal conditions, signals are made to vessels for entering or leaving the dock or basin at Inch'ŏn by means of flags
40 or lights, disposed vertically, hoisted at the signal mast on the northern side of the entrance to the lock gate, as follows:—

1. When the lock gate is open:—

	<i>Day signal.</i>	<i>Night signal.</i>	<i>Signification.</i>
45	A red triangular flag above a white triangular flag.	A red light above a white light.	Enter the dock.
	A white triangular flag above a red triangular flag.	A white light above a red light.	Leave the dock.

50 2. When the lock gate is closed:—

	<i>Day signal.</i>	<i>Night signal.</i>	<i>Signification.</i>
	A red square flag below two white square flags.	A red light below two white lights.	Enter the dock immediately.

Charts 1270, 1258, 1256, 1262, 2347.

Chart 3642, plan of Inch'ŏn hang.

<i>Day signal.</i>	<i>Night signal.</i>	<i>Signification.</i>
A red square flag between two white square flags.	A red light between two white lights.	Leave the dock.
3. When entering or leaving the dock is suspended :—		
<i>Day signal.</i>	<i>Night signal.</i>	<i>Signification.</i>
Three red square flags.	Three red lights.	Entering the dock is suspended.
Two red square flags.	Two red lights.	Leaving the dock is suspended.

When a vessel inside the dock is about to leave her position she must sound one long blast of about ten seconds duration on the siren ten minutes before moving.

Harbour facilities.—Supplies.—Communications.—Minor repairs can be undertaken. There are two graving docks and several patent slips.

There are two floating cranes, with capacities of 12 and 30 tons, respectively ; also several fixed cranes and a 5-ton travelling crane. Several tugs and numerous lighters are available.

There is hospital accommodation at Inch'ŏn and also at Kyŏngsŏng.

Fresh provisions are obtainable. Water is laid on to the berths in the tidal basin. Water boats supply vessels in the outer harbour.

Stocks of coal are maintained.

Fuel oil is available only in emergency, and then by special arrangement with the Government.

Inch'ŏn is connected to the Korean railway system, and it is connected to the general telegraph and telephone systems.

There is frequent communication by sea with North China, Japan, and other ports in Korea.

Storm signals.—Storm signals are displayed from a signal station situated about 4 cables north-eastward of the entrance to the tidal basin (*Lat.* 37° 28' N., *Long.* 126° 37' E.). See page 28.

Trade.—In normal times, the principal exports are rice, soya beans, hides, and charcoal ; imports are wheat, sugar, oils, textiles, coal, cement, etc.

Climatic table.—See Chapter I, page 79.

Chart 1258.

RIVERS ABOVE INCH'ŌN.—Yŏm ha.—Tidal streams.—Buoys and Beacons.—Yŏm ha (Salée river) branches off from Han gang (Han gan or Seoul river) about 20 miles northward of Inch'ŏn, and the channel winds between numerous rocks and sandbanks. For a distance of about 7 miles above Yŏngjŏng do there are depths of from 5 to 10 fathoms (9^m1 to 18^m3) in the narrowest parts of the channel, and from 2 to 3 fathoms (3^m7 to 5^m5) in the wide parts, but above that it becomes shallower. For a distance of about 10 miles northward from Inch'ŏn, the river runs between extensive drying banks, on which numerous islands are situated ; among these are Ch'ŏngna do (Phalyŏm), Chang do (Laplace islet), Ŭng do (Pomsyŏm), Un'gyŏm do (Sodangsyŏm), Seŏ do (Sheiru to), Ka sŏ (Pilot islet), and Hwangsan do (Louise islet). Further northward it runs through a narrow channel between the mainland, eastward, and the large island of Kanghwa do (to), westward. Several promontories, with old forts on them, project from the eastern side of Kanghwa do.

Charts 1270, 1256, 1262, 2347.

Chart 1258.

The tidal streams in the narrowest parts attain a rate of 8 knots at spring tides, and, except with thorough local knowledge navigation is very difficult. The fogs, which occur from May to August are an additional danger, and they frequently last for two or three days. The channel is marked by buoys and beacons, but these are liable to be shifted or swept away by floods and other causes; the buoys are removed from the latter part of November until the middle of March.

Han gang.—Han gang is formed by the confluence of two rivers, 10 which unite about 15 miles eastward of Kyōngsōng (*Lat.* 37° 35' N., *Long.* 126° 58' E.). From this junction the river flows westward, passing along the southern outskirts of Kyōngsōng, and then turns north-westward; about 20 miles below Kyōngsōng it is joined by Imjin gang (Changtan kai), which flows in from northward, and it 15 then bends westward. After about 6 miles it divides into two, the southern branch being Yōm ha, previously described, whilst the main branch continues westward, passing northward of Kanghwa do, where it is joined by Yesong gang (Yesan kan), and thence into the sea.

The banks are mostly steep and well wooded; the fairway is lined 20 on both sides by mud flats which dry. The bed of the river changes from time to time, especially during the rainy season, and its navigation requires great caution; it is mostly used by sailing craft not exceeding 5 feet (1^m5) in draught. The river freezes over in winter.

The approaches to Han gang from westward are described in 25 Chapter XII commencing at page 619.

Kyōngsōng.—Kyōngsōng or Seoul is the capital of South Korea. The population in 1946 was 1,141,766.

Charts 3642, plan of Gazan byochi and approaches, and 1270.

ASAN MYOJI AND APPROACHES.—**General remarks.**—On the 30 eastern side of Tong sudo is the mouth of a gulf which extends about 20 miles eastward and forms the approach to Asan myoji (Gazan byōchi). P'ung do (page 599) and the islets and banks extending eastward from it, divide the gulf into two channels, the northern of which, being wider and less obstructed by banks, is the one generally used.

35 *Chart 1270.*

Southern channel.—**Islands and dangers.**—The southern channel leading to Asan myoji is approached by passing northward of Changan t'oe (page 593), and is entered between Taeranji do (page 595), the largest island off the entrance to Tōgam p'o and P'ung do.

40 *Charts 3642, plan of Gazan byochi and approaches, and 1270.*

Yuk to (Roku tō), 196 feet (59^m7) high, with a small group of trees on its summit, lies nearly 2½ miles eastward of P'ung do, and is the central and largest of a group of five islets; the two northern islets are 115 and 108 feet (35^m0 and 32^m9) high, respectively, and 45 are named Maryuk to, and the two southern are Chungnyuk to (Chūroku tō), 193 feet (58^m3) high, and Miyuk to, 144 feet (43^m9) high. Between the three northern islets of the group and the bank extending eastward from P'ung do there is a narrow passage with depths of from 8 to 10 fathoms (14^m6 to 18^m3). The tidal streams 50 amongst these islets are very strong.

Sōngmun gak (Sekimon kaku) (*Lat.* 37° 03' N., *Long.* 126° 30' E.), situated about 2 miles south-eastward of Miyuk to, is the extremity of a peninsula connected to the mainland about 1½ miles south-eastward

Charts 1256, 3480, 1262, 2347.

Charts 3642, plan of Gazan byochi and approaches, and 1270.

of this point by an isthmus about $1\frac{1}{2}$ cables wide. Sōngmun (Sekimon) san, 254 feet (77^m4) high, is a pointed peak immediately northward of the isthmus; the summit of the peninsula is 273 feet (83^m2) high, and is thickly wooded with pine trees. Tangjinp'oni (Tōshinkyōro) is a reef which extends nearly $1\frac{1}{2}$ miles north-north-eastward from Sōngmun gak; there are two or three rocks above water on it, and on the outer extremity is a rock 80 feet (24^m4) high. The channel between this rock and Miyuk to is nearly one mile broad, with depths of from 10 to 20 fathoms (18^m3 to 36^m6). The northern and north-eastern sides of the peninsula are fringed by a reef which dries.

Ipp'a do (Rippa tō), 310 feet (94^m5) high, lies about $2\frac{3}{4}$ miles north-eastward of Sōngmun gak; its summit, which is situated in the northern part, is a good mark for the channel. A bank, which partly dries, extends about $3\frac{3}{4}$ miles westward from Ipp'a do, leaving only a narrow channel between its extremity and Maryuk to. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about one mile eastward from Ipp'a do. Haksan sō (Kakusan sho), a rock 19 feet (5^m8) high, lies nearly three-quarters of a mile north-westward of the northern point of Ipp'a do.

Chart 3642, plan of Gazan byochi and approaches.

Kukhwa do (Kikka tō) consists of three islets, 104 to 117 feet (31^m7 to 35^m7) high, lying on a bank which dries; the northern islet lies about $1\frac{1}{4}$ miles south-south-eastward of Ipp'a do. A rock, which dries, lies about one cable southward of the southern islet. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about 3 miles west-north-westward from Kukhwa do, leaving only a narrow channel between its extremity and Tangjinp'oni; some drying patches lie about one mile westward of the central islet.

Changgohang gak (Chōkō kaku) is situated about $1\frac{1}{4}$ miles south-eastward of Sōngmun san, and the bight between is occupied by a mud bank which dries. Between Changgohang gak and Sōnggumi (Jokyūbi), a point situated about 7 miles east-south-eastward, is a bay entirely filled by a mud flat which dries, and which is intersected by the outlet of a small river; a rock, which dries 22 feet (6^m7), lies about one mile south-eastward of Changgohang gak and on the outer edge of this bank. There are numerous long rows of fishing stakes along the outer edge of this bank.

Chungang ch'ont'oe (Chūō sentai), a bank which partly dries, lies in the middle of the gulf, and separates the southern and northern channels. Within the 3-fathom (5^m5) line, it extends about $6\frac{1}{4}$ miles south-eastward from a position about 2 miles eastward of Kukhwa do. The passage between Chungang ch'ont'oe and Kukhwa do is obstructed by a middle ground which partly dries, and the only practicable route to Asan myoji by the southern channel is between Kukhwa do and the mainland southward.

Chart 1270.

Northern channel.—Islets and dangers.—The northern channel leading to Asan myoji is entered from westward between P'ung do and Mudang sō (Fudo sho), a rock, which dries 21 feet (6^m4), lying about $2\frac{1}{4}$ miles north-eastward. The channel then runs along the northern side of the banks between P'ung do and Ipp'a do, and northward of Haksan sō.

Charts 1258, 1256, 3480, 1262, 2347.

Chart 3642, plan of Gazan byōchi and approaches.

A shoal, with a depth of 34 feet (10^m4) over it, lies near mid-channel about $1\frac{1}{2}$ miles north-north-eastward of Haksan sō.

- Tori do (Tōri tō) (*Lat. $37^{\circ} 07' N.$, *Long. $126^{\circ} 37' E.$*) is a small islet, 5 169 feet (51^m5) high, precipitous on its western side, lying about $3\frac{1}{2}$ miles eastward of the northern extremity of Ipp'a do; Tori ch'ont'oe (Tōri sentai), a bank which dries, extends about $2\frac{1}{2}$ miles eastward from this islet to within about half a mile of Silli gak (Shinri kaku), the northern entrance point to Namyang man (Nanyō wan). Sodori 10 do (Shōtōri tō) is a rock, 32 feet (9^m8) high, lying about 2 cables northward of Tori do. Rocks extend about a quarter of a mile southward and three-quarters of a mile northward from Tori do; their positions can best be seen from the chart. The northern channel to Asan myoji passes between Ipp'a do and Tori do, and thence 15 between Chungang ch'ont'oe and the banks fronting the entrance to Namyang man. A mudbank dries out for nearly 4 miles north-westward and about half a mile south-westward of Koonni, a point situated about $5\frac{1}{2}$ miles south-eastward of Silli gak. Several islets and rocks lie on this mudbank westward of Koonni; Kok to (Kyoku 20 tō), 46 feet (14^m0) high, is the westernmost of these. A detached shoal, with a depth of $2\frac{1}{2}$ fathoms (4^m6) over it, lies about $1\frac{1}{2}$ miles west-south-westward of Koonni.*

- Asan myoji.—Dangers.**—The entrance to Asan myoji (Gazan byōchi) lies between Sōnggumi and the mudbank which extends from 25 Koonni. Pang do (Bō tō) is the name given to a group of rocks above water lying about midway between these two points; the highest of these is 43 feet (13^m1) high, and a shoal, with depths of less than 3 fathoms (5^m5) over it, extends about 6 cables north-westward of it. A rock, which dries 8 feet (2^m4), lies about 2 cables 30 westward of the 43-foot (13^m1) rock, and about a quarter of a mile south-westward of the latter is a rock 3 feet (0^m9) high. There is a narrow passage between the shoal around Pang do and the south-eastern extremity of Chungang ch'ont'oe. A reef, which dries 25 feet (7^m6), lies nearly $1\frac{1}{2}$ miles southward of Koonni, and about half 35 a mile eastward of this reef is another reef, which dries 8 feet (2^m4).

- The southern side of Asan myoji is bounded by the mudbank which occupies the entire bay between Sōnggumi and Hanjin gak (Kanshin kaku), situated about 4 miles east-south-eastward; Noe 40 do (Nai tō), 120 feet (36^m6) high, is situated on the northern edge of the bank and about midway between these two points. Hanjin-ni (Kanshin) is a small village situated on the eastern side of Hanjin gak. The northern side of Asan myoji is bounded by the shoal flats which extend south-eastward from a position about one mile southward of Koonni to Nomi gak (Robi kaku), which is situated about 45 $1\frac{1}{2}$ miles northward of Hanjin gak.

- Songak (Shūgaku) san is a peak, 478 feet (145^m7) high, situated nearly 3 miles south-westward of Hanjin gak, and about $2\frac{1}{2}$ miles westward of Songak san is a peak 348 feet (106^m1) high with a prominent, ancient fire beacon on top. Nomi (Robi) san, 350 feet 50 (106^m7) high, is situated about one mile north-eastward of Nomi gak.

The depths through the greater part of Asan myoji vary between 7 and 10 fathoms (12^m8 and 18^m3), rock or sand; the tidal streams are strong, and sometimes attain a rate of $3\frac{1}{2}$ knots. A shoal, with a least depth of 25 feet (7^m6) over it, lies about half a mile south-

Chart 3642, plan of Gazan byochi and approaches.

eastward of the 43-foot (13^m1) rock of Pang do, and a 33-foot (10^m1) patch lies about 1½ miles south-eastward of the same rock. A rock, which dries 20 feet (6^m1), lies about 4 cables northward of Hanjin gak, and there is foul ground, with some rocks which dry, for 5 about 1½ miles east-south-eastward of this rock.

Asan naehang.—Dangers.—Beacon.—The channel from Asan myoji continues for a further 4½ miles south-eastward from Nomi gak, with depths of from 4 to 10 fathoms (7^m3 to 18^m3), thus forming an inner harbour, called Asan naehang. The north-eastern shore is 10 fringed by mud flats which dry, off the outer edge of which are some drying rocks. On the south-western side of the channel are numerous banks, some of which dry. Yōng am (Ei gan) is a prominent, pointed rock, 43 feet (13^m1) high, lying nearly 1½ miles east-south-eastward of Hanjin gak. Haengtōm do (Kotaku tō), 115 feet (35^m0) 15 high, is situated about 2 miles south-eastward of Hanjin gak (*Lat.* 36° 58' N., *Long.* 126° 47' E.) and is surrounded by a mudbank which dries. The space between Haengtōm do and Hanjin gak is almost entirely occupied by a bank which dries, leaving only a narrow and shoal channel on its western side; the southern extremity 20 of this bank is marked by a black beacon, with an octagonal concrete base, surmounted by a sphere. Hyōnnae gak (Kennai kaku) is situated about three-quarters of a mile southward of Haengtōm do.

South-eastward of Haengtōm do the bay widens out, but becomes very shoal, and at Sinsōng gak (Shinjō kaku), a low point situated 25 about 4½ miles south-eastward of Hyōnnae gak, where the bay divides into two arms, it dries almost entirely. Kwōngwan gak (Kengan kaku) lies about 1½ miles north-eastward of Sinsōng gak. *Charts 3642, plan of Gazan byochi and approaches, and 1270.*

Tidal streams.—About 2 miles northward of the line joining 30 P'ung do and Ipp'a do the tidal streams run eastward and westward, turning at about the times of high and low water at Inch'ōn (Admiralty Tide Tables Standard Port); the maximum rate is 4½ knots. From one to 4 miles eastward of Ipp'a do the tidal streams run south-eastward and north-westward. 35

At Asan myoji the tidal streams run east-south-eastward and west-north-westward, turning at about the times of high and low water at Inch'ōn; the maximum rate is 3 knots.

Directions.—A vessel proceeding to Asan myoji by the northern channel should pass about one mile northward of P'ung do, and steer 40 an easterly course to a position one mile northward of Haksan sō; thence steer 118°, and when one mile southward of Tori do course should be altered to 135° for the 3-foot (0^m9) rock at the south-western end of Pang do, thus passing between the shoal which extends north-westward from Pang do and the south-eastern extremity of 45 Chungang ch'ōnt'oe. Pass fairly close south-westward of the 3-foot (0^m9) rock, and then proceed eastward to the anchorage, taking care to avoid the shoal, with a least depth of 25 feet (7^m6) over it, lying about half a mile south-eastward of Pang do.

As the passage westward of Pang do is very narrow, and a depth of 50 not more than about 4 fathoms (7^m3) can be carried through it, the route just described is only suitable for vessels of moderate size. There are greater depths in the fairway of the southern channel, but local knowledge is required by a vessel using it.

Charts 1258, 1256, 3480, 1262, 2347.

Chart 1258.

COAST BETWEEN ASAN MYOJI AND INCH'ŌN.—General remarks.—The coast between Asan myoji and Inch'ōn consists of several peninsulas, and is deeply indented by bays, although these are almost entirely occupied by flats which dry. Numerous islands, islets and rocks lie on the large drying banks which extend from this coast. *Chart 3642, plan of Gazan byochi and approaches.*

Punyang man.—Dangers.—The entrance to Punyang man (Funyō wan) is on the northern side of Asan myoji, between Nomi gak and Koonni. This bay penetrates the land for about 10 miles and has numerous arms, but there is only a narrow, shallow channel through the mud flats. A reef extends about 3 cables from the western side of Nomi gak and there are two rocks on it; the western rock is 52 feet (15^m8) high and appears white. Tokpi do (Dokuhi tō) consists of two islets, each 46 feet (14^m0) high, lying on the edge of the mud flat on the northern side of the channel and about one mile within the entrance.

Namyang man.—Depths.—Dangers.—Namyang man (Nanyō wan), situated north-westward of Punyang man, runs north-eastward for nearly 10 miles. Namyang gak (Nanyō kaku) is situated about 5 miles north-eastward of Silli gak, and between these two points is a gradually narrowing channel, with depths of from 4 to 1½ fathoms (7^m3 to 2^m7), between the mudbanks on either side. Namyang gak divides the bay into two arms, and the village of Namyang (Nanmyagu) (chart 1258), situated about 1½ miles from the head of the northern arm, is reached by landing at that point.

Namyang bando, the southern extremity of which is Silli gak, separates Namyang man from the large bay southward of Inch'ōn and is joined to the mainland by an isthmus, about 1½ miles wide, at the head of the northern arm of Namyang man. Haeun (Kaiun) san (*Lat. 37° 08' N., Long. 126° 43' E.*), situated in the southern part of this peninsula and about 1½ miles north-eastward of Silli gak, is 463 feet (141^m1) high and has a small group of trees on its summit and a single pine tree on its northern shoulder.

There is a channel, with depths of from 13 to 28 feet (4^m0 to 8^m5) in the fairway, between the northern side of Tori ch'ōnt'oe (page 614) and the coastal bank extending westward from Namyang bando; this channel leads into the entrance of Namyang man from westward, but a rock, which dries 4 feet (1^m2), lies at its eastern end and nearly half a mile southward of Silli gak. A rock 8 feet (2^m4) high, with a rock awash about 2 cables southward of it, lies on the edge of the coastal bank on the northern side of this channel and about one mile south-westward of Sōyō gak (Seijo kaku), a point lying about 2½ miles north-north-westward of Silli gak.

Chart 1270.

Islands and channels between Namyang bando and Yōnghūng do.—Most of the area between Namyang bando and Yōnghūng do, which lies nearly 10 miles westward and was mentioned on page 599, is occupied by Taebu do (Daifu tō), a large island of irregular shape surrounded by extensive drying mudbanks, which also embrace Namyang bando, and on which a number of smaller islands and rocks are situated. Chebu do (Saifu tō) lies with its southern extremity about 1½ miles westward of Sōyo gak and on the coastal bank which dries out for about 2½ miles westward of this point; the summit of

Chart 1270.

Chebu do, 212 feet (64^m6) high, is on its northern extremity, and there is also a wooded peak, 190 feet (57^m9) high, in the centre of this island. About 1½ miles westward of Chebu do is the entrance to Masan sudo (Mazan suidō), a narrow channel which runs about 3½ miles east-north-eastward before turning generally northward. The entrance to Masan sudo is fronted by a bar, with a depth of about 2 fathoms (3^m7) over it, and the channel then leads between the northern extremity of Chebu do and a reef, which dries 14 feet (4^m3), situated about half a mile north-north-westward; beyond this the channel runs between various islets and rocks, and is only navigable by small craft with local knowledge. There are depths of from 3 to 7 fathoms (5^m5 to 12^m8) in the fairway for nearly 5 miles above the bar.

The positions of the various islands and rocks between Namyang bando and Taebu do can best be seen from the chart; they include T'an do (Junbu tō), 223 feet (68^m0) high; Pul to (Fu tō) 108 feet (32^m9) high; Sōngam do (Senkan tō), 389 feet (118^m6) high; Ō do (Gyō tō), 143 feet (43^m6) high; and Sōk to (Seki tō), 118 feet (36^m0) high.

Hwanggūm (Ōgon) san, 534 feet (162^m8) high, the summit of Taebu do, is situated in the northern part, and appears as a prominent sharp peak when seen from westward, but is rounded when seen from northward or southward. A group of trees on a hill 111 feet (33^m8) high, on the south-eastern promontory of Taebu do, is a good landmark. A reef, which dries 8 feet (2^m4), lies about 6 cables southward of the southern point of the island and on the southern edge of the mudbank. Kūlgwan do (Kikkan tō), 111 feet (33^m8) high, lies about one mile west-north-westward of the southern point of Taebu do.

Yōnghūng sudo (Reikō suidō), situated between the western side of the mudbank surrounding Taebu do and the eastern side of the mudbank around Yōnghūng do, is much obstructed by reefs and banks, and is only available for vessels of very light draught. Sam sō (San sho) consists of three islets lying in an east and west direction in the middle of the channel; the eastern islet is 46 feet (14^m0) high, and the western 75 feet (22^m9) high. Maenggōlbōl (Mōkyoribatsu) is a narrow drying bank which extends about 2½ miles west-south-westward from these islets; the channel lies westward of this bank and eastward of Nipp'yo sō (Rippyō sho), a rock which dries 12 feet (3^m7), situated nearly one mile south-westward of the western islet of Sam sō. There are several rocks on either side of the channel northward of Sam sō, and the positions of these are best seen on the chart. Sōnjae do (Sensai tō), situated on the mudbank on the eastern side of Yōnghūng sudo, has its summit, 183 feet (55^m8) high, close to its southern coast; Yōn do (Soku tō) (*Lat.* 37° 14' N., *Long.* 126° 31' E.), 193 feet (58^m8) high, lies about 3 cables south-westward of the south-western point of Sōnjae do. Pyōn do (Ben tō), a small islet, 85 feet (25^m9) high, with a sharp peak, lies in the northern entrance of Yōnghūng sudo; foul ground extends about one cable south-eastward from this islet, and there is a deep channel between the foul ground and T'agubong do (Takyūhō tō), 111 feet (33^m8) high, situated about 4 cables south-eastward. Kūbongni do (Fukuhō tō), 301 feet (91^m7) high, and Chōn do (Shuntō tō), 321 feet (97^m8) feet high, lie between T'agubong do and the north-western extremity of Taebu do.

Charts 1258, 1256, 3480, 1262, 2347.

Charts 1270, 1258.

Bay northward of Namyang bando.—Islands and dangers.—Northward of Namyang bando is a large bay which is entered between Taebu do and the flats which extend southward from Inch'ōn. The
 5 greater part of this bay is filled by mudbanks which dry, only leaving some narrow winding channels between the banks. Two islets lie within the entrance; Karigi do (Kakariki tō), the western, is 95 feet (29^m0) high and lies about 6 miles eastward of P'almi do (page 600) and Sangganigi do (Jōkariki tō), 118 feet (36^m0) high, lies about
 10 3 cables east-south-eastward of Karigi do. A bank, with depths of 3 fathoms (5^m5) and less over it, extends about 5½ miles westward from these islets, almost reaching Pukchangja sō (page 600); a similar bank extends eastward from them, and joins that which extends from the mainland. Three rocks, which dry from 20 to 26 feet (6^m1 to
 15 7^m9), are situated about 2 miles east-south-eastward of Sangganigi do. A rock, which dries 5 feet (1^m5), lies on the edge of the drying bank about 3 miles northward of Karigi do (*Lat. 37° 19' N., Long. 126° 36' E.*). A shoal spit extends nearly 3 miles westward from the corner of the drying mudbank about 7 miles southward of
 20 Inch'ōn; near its outer end there is a 4-foot (1^m2) patch.

Several islets lie on the mudbanks within the bay. Oi do (Grivel island), 252 feet (76^m8) high, the largest of these, is situated nearly 4½ miles east-north-eastward of Karigi do and has a group of trees on its summit; Okku do (Alexander island), 296 feet (90^m2) high, lies about
 25 one mile north-eastward of Oi do. Hyōng do (Cheudi), 477 feet (145^m4) high, is situated about 3 miles southward of Oi do and has a sharp, rocky summit; Uūm do, 221 feet (67^m4) high, lies nearly 3 miles eastward of Hyōng do, and has a group of trees on its summit. Manhak san (Mount Zoe), on the northern side of the bay, has a sharp,
 30 rocky summit 744 feet (226^m8) high, and is a good landmark.

Charts 1256, 3480, 1262, 2347.

CHAPTER XII.

THE EASTERN SIDE OF YELLOW SEA.—THE WESTERN COAST OF KOREA,
FROM HAN GANG TO AMNOK KANG.

Chart 1258.

WESTERN APPROACHES TO HAN GANG.—Between Tōkchōk kundo (page 596) and Yōnp'yōng yōlto (Yonpyon islands), situated about 37 miles northward of the south-western group of Tōkchōk kundo, there are two deep channels leading to the outer part of the estuary of Han gang; the south-eastern of these leads to Changbong sudo (Chambon channel), and the north-western leads to Sōngmo sudo (Meioumu channel). Changbong sudo is a cul-de-sac, as it narrows and shoals at its north-eastern end, and there is only a passage for small craft at high water into Yōm ha. Small vessels with local knowledge can reach Han gang by Sōngmo sudo.

Charts 1270, 1258.

Southern channel.—Islands and dangers.—Changbong sudo.—Hanson do (*Lat. 37° 11' N., Long. 125° 55' E.*) and Kurōp to, with the bank lying northward of the latter (*see* page 597), lie on the southern side of the entrance to the southern channel, which terminates north-eastward in Changbong sudo; the channel then runs north-eastward along the northern side of Sōnmi do (page 597) and the banks between this island and Yongyu do (page 603). The northern side of the channel is formed by numerous banks, which dry in parts, extending for about 35 miles south-westward from Kanhwa do, the large island which forms the western side of the northern part of Yōm ha; for details of these banks the chart should be consulted.

Changbong sudo (Chōhō suidō or Chambon channel) is about $1\frac{1}{2}$ miles wide at its south-western entrance, between the north-western extremity of Yongyu do (Ryūyū tō or Yonyo to) and a bank, which mostly dries, extending about $3\frac{1}{4}$ miles south-south-westward from Changbong do (Chambon to), an island lying about 3 miles northward of Yongyu do; four small islets lie on this bank, and Wa sō (Gagyo tō or Hau to), the highest, is 207 feet (63^m1) high and lies about $1\frac{1}{2}$ miles south-westward of the south-western point of Changbong do. Pigaji, 148 feet (45^m1) high, Sa sō (San tō), 187 feet (57^m0) high, and Kosigi (Koshokuki), 66 feet (20^m1) high, the other three islets, are situated about one mile north-eastward, eastward, and southward of Wa sō, respectively. A sand bank, with depths of from 3 to 16 feet (0^m9 to 4^m9) over it, lies off the entrance to Changbong sudo, and extends about 2 miles south-westward from a position about 4 miles southward of Wa sō. Changbong do has a prominent

Charts 1256, 1262, 2347.

Charts 1270, 1258.

wooded summit, 479 feet (146^m0) high, in about the middle of the island ; the coasts are mostly sandy beaches and low cliffs. A small sandbank, with a least depth of 13 feet (4^m0) over it, lies on the eastern side of the fairway and about 1½ miles southward of the eastern extremity of Changbong do (*Lat. 37° 32' N., Long. 126° 23' E.*).

Changbong sudo widens out to about 5½ miles between the eastern point of Changbong do and the north-western point of Yǒngjǒng do (Eisō tō or Yoguchon to) (page 603), but it is greatly obstructed here by islands, islets, and banks, Sin do (Felicie island), the largest and eastern of these islands, is 582 feet (177^m4) high and separated from the northern side of Sammok to (page 603) by a channel about one mile wide, with depths of from 4 to 5 fathoms (7^m3 to 9^m1) in the fairway, but there are many rocks in the eastern entrance, and a rock, with a depth of 6 feet (1^m8) over it, lies in the middle of the western entrance. Si do and Mo do (Chabannes islands) lie close together westward of Sin do ; Si do, 355 feet (108^m2) high, is connected to Sin do by a mudbank which dries, and there is a group of trees on its summit. Mo do is 312 feet (95^m1) high and separated from the western side of Si do by a narrow channel with a least depth of one foot (0^m3). Pu ch'o, a thickly wooded islet 118 feet (36^m0) high, lies in about the middle of the channel between Mo do and the eastern extremity of Changbong do ; there is a deep passage on either side of this islet, but rocks, which dry, extend about 3 cables from its southern end. After passing between Changbong do and Mo do the main channel of Changbong sudo turns eastward between the northern sides of Si do and Sin do and the bank which extends southward from Kanghai do, but it becomes very narrow and shoal.

Tidal streams.—The tidal streams in Changbong sudo run north-eastward and south-westward, turning about half an hour after high and low water at Inch'ōn ; their maximum rate is about 3 knots, except between Changbong do and Pu ch'o where they may attain a rate of 6 knots.

Chart 1258.

Northern channel.—Islands and dangers.—Sǒngmo sudo.—Tidal streams.—Anchorage.—Buoys.—The northern channel of approach to Han gang is separated from the southern channel by the banks which extend about 35 miles south-westward from Kanghai do ; there is access to the southern channel by several channels through these banks, but, as they are liable to change, they should not be attempted without local knowledge. The northern side of this channel is bounded by banks which extend east-north-eastward to the coast from a position about 25 miles south-westward of Yǒnp'yǒng yǒlto. Sin do (Saru somu) is an isolated islet lying on the southern side of the channel and nearly 14 miles westward of the south-western extremity of Changbong do ; it has a flat summit 128 feet (39^m0) high, covered with grass and trees, and is frequented by innumerable sea birds. U do (Moro somu), situated about 7 miles north-north-westward of Sin do (*Lat. 37° 31' N., Long. 126° 03' E.*) and on the northern side of the channel, is an islet 243 feet (74^m1) high with a prominent group of trees on it ; a rock, which dries 6 feet (1^m8), lies close off its eastern side. U do is surrounded by banks which dry, and westward and south-westward of the islet are four rocks ; Sǒk to, the outermost of these, lies about three-quarters of a mile south-

Charts 1256, 1262, 2347.

Chart 1258.

westward of U do and is 46 feet (14^m0) high, and Pi do, the north-western rock, is 75 feet (22^m9) high.

Sōman do, 229 feet (69^m8) high, is the north-western of two islets lying on a sandbank, which dries, on the southern side of the approach channel to Sōngmo sudo (Meiyoumu channel) ; Tongman do, the south-eastern islet, lies about 2 miles west-south-westward of the north-western point of Changbong do and is 305 feet (93^m0) high. Depths of 6 feet (1^m8) are situated about one mile north-north-westward of Sōman do. Chumun do (Shomon to) lies about 4½ miles north-westward of Changbong do and on the northern side of the approach channel to Sōngmo sudo ; it has a prominent rounded summit, 467 feet (142^m3) high, and the coasts are mostly sandy beaches, with occasional cliffs. A sandbank, which dries, extends about 2 miles south-westward from Chumun do, and on it are several islets and rocks, 15 above water or drying, including Punji do, a small islet 87 feet (26^m5) high. Sushito, 83 feet (26^m2) high, lies about half a mile south-eastward of the south-eastern point of Chumun do and is connected to it by a reef which dries. Manderi ch'o (reef), a rock which dries 19 feet (5^m8), lies about 1½ miles south-south-westward of the south-eastern point of Chumun do, with shoal water between. 20

Ach'a do, 162 feet (49^m4) high, with a prominent clump of trees on the hill on its western end, lies about 2 cables northward of Chumun do, and the channel between is so encumbered with rocks that it is not even suitable for boats. Porum do (Porumu to), 325 feet (99^m1) high, lies about three-quarters of a mile north-westward of Chumun do and the channel between is encumbered with rocks ; a sandbank, which dries, extends about 6 miles south-south-westward from this island. Pi do (Kuchomu to) lies about half a mile north-westward of Porum do, with foul ground in the channel between ; its summit, 347 feet (105^m7) high and has a prominent group of trees on it (*Lat.* 37° 41' N., *Long.* 126° 08' E.). 25

Kanghwa do (to) is the large island which divides Han gang into two branches, Yōm ha on the eastern side, and the main stream on the northern side of the island. There are four ranges of hills on the island, all of which run in an east and west direction. Mani san, the summit of the island, is situated in the middle of the southernmost range and is 1,554 feet (473^m7) high ; it is the most important mountain in this district, and when seen from eastward or westward appears as a sharp, rocky peak, whilst from northward or southward it shows a double peak. Chin'gang san (Baron peak), situated about 3½ miles northward of Mani san, is 1,440 feet (438^m9) high and rises abruptly from the plain ; it appears as an island when seen from westward. About 3 miles northward of Chin'gang san is a flat-topped mountain 1,518 feet (462^m6) high. An isolated peak 1,298 feet (462^m1) high, situated near the north-western corner of the island, is a good landmark. A peak, 946 feet (288^m3) high, lying about 3 miles southward of the northern point of the island, is rendered prominent by a heap of stones on the western side of its summit. The coasts of the island are mainly cliffy, but are not precipitous ; Tonggūm do, situated close off the south-eastern point, is 336 feet (102^m4) high and appears as part of the main island. A bank, which dries, extends from the southern coast, and almost connects with that extending from the northern sides of Changbong do and Sin do. 30 35 40 45 50

Charts 1256, 1262, 2347.

Chart 1258.

Sŏngmo do (Meioumu to) lies on the western side of Sŏngmo sudo, with its south-eastern extremity about $1\frac{1}{4}$ miles northward of Chang got, the western extremity of the southern part of Kanghwa do ; hills rise from the northern and south-eastern sides of the island, with low, flat land between, so that it appears as two islands from a distance. The summit of the island is situated near the south-eastern extremity and is 1,060 feet (323^m1) high ; thence a rugged rocky ridge extends north-westward to a peak, 1,000 feet (304^m8) high, from which it descends gradually to Nan got (*Lat.* $37^{\circ} 43' N.$, *Long.* $126^{\circ} 16' E.$), the western point of the island. Ōyujŏng do, a flat-topped island 243 feet (74^m1) high, sparsely covered with pine trees, lies on the mud flat which extends about $1\frac{1}{4}$ miles southward from the south-eastern part of Sŏngmo do ; a rock, which dries 5 feet (1^m5), lies about 2 cables off the south-eastern point of Ōyujŏng do. Some banks, which dry, and several rocks, lie between Sŏngmo do and Chumun do ; Taesong do, a small islet 62 feet (18^m9) high, lies about $1\frac{1}{2}$ miles north-westward of Ōyujŏng do and three-quarters of a mile off the south-western coast of Sŏngmo do. Sŏgŏm do is a flat-topped island, 192 feet (58^m5) high, lying about one mile west-north-westward of Nan got ; it is sparsely wooded with pine trees and has a few houses on it. A sandbank, which dries, extends about $2\frac{1}{4}$ miles southward from Sŏgŏm do, and also northward to connect this island to the south-western end of Kyodong do (Kyodon to), which is described below. Solchaek, 121 feet (36^m9) high, and Nap to, 75 feet (22^m9) high, lie on this sandbank about half a mile northward and 4 cables westward, respectively, of Sŏgŏm do. Kwiha do, 134 feet (40^m8) high, lies about midway between the eastern point of Sŏgŏm do and Nan got. Mibom do, 157 feet (47^m8) high and sparsely wooded with pine trees, lies about three-quarters of a mile northward of Nan got. Sŏ do, 88 feet (26^m8) high, lies north-eastward of Mibom do and about 3 cables off the north-western point of Sŏngmo do. The channel between Sŏngmo do and Sŏgŏm do is encumbered with rocks and drying sandbanks, and is only suitable for boats.

Sŏngmo sudo (Meioumu channel) is the winding channel between the western coasts of Kanghwa do and the eastern coast of Sŏngmo do, and is entered from southward between Chang got and Ōyujŏng do ; there are several islets and dangers in this channel, and the positions of these can best be seen on the chart. Sŏngmo sudo is about 4 cables wide in its narrowest part, off the eastern extremity of Sŏngmo do, and the tidal streams may attain a rate of over 6 knots here ; elsewhere the maximum rate is from 3 to 4 knots. There is good anchorage for small vessels with local knowledge, in depths of from 3 to 4 fathoms (5^m5 to 7^m3), off the south-eastern point of Sŏngmo do.

Kyodong do (Kyodon to) is a cultivated island lying with Hodu got, its eastern extremity, about one mile westward of Inhwa got, the north-western point of Kanghwa do ; Hodu got is a reddish cliff 141 feet (43^m0) high. The summit of the island, 840 feet (256^m0) high, is situated in the south-eastern part, and appears as a sharp peak, when seen from eastward or westward. A peak, 425 feet (129^m5) high, near the western extremity of the island, is rendered prominent by a pile of stones, 10 feet (3^m0) high, on its summit. A rock, which dries 26 feet (7^m9), lies about a quarter of a mile off Mit'an gak, the

Charts 1256, 1262, 2347.

Chart 1258.

western point of Kyodong do. Ch'ongju ch'o (Chogushu to) is a large sandbank, which dries, lying off the north-western side of Kanghwa do, and separated from Kyodong do by a narrow channel. Kwidŭng got (Kito point) lies about $1\frac{1}{2}$ miles westward of the northern extremity of Kanghwa do (*Lat. $37^{\circ} 50' N.$, Long. $126^{\circ} 26' E.$*). After passing between Hodu got and Inhwa got, the main channel is westward and northward of Ch'ongju ch'o to the mouth of Yesong gang, which flows out about 5 miles north-eastward of Hodu got, and then steering south-eastward for the entrance of Han gang.

Hambak to (Cone islet), 202 feet (61^m6) high, lies about $4\frac{1}{2}$ miles north-north-eastward of U do (page 620) and on the edge of Hannaksa (Kannakupuru), a large sandbank which extends about 9 miles south-westward from Yuch'on gak, a prominent headland 187 feet (57^m0) high, with some rocks and trees on its summit, situated nearly 12 miles north-eastward of U do; for about $1\frac{1}{2}$ miles offshore this sandbank only covers at spring tides. A drying reef lies in the channel about half a mile eastward of Hambak to, and there are several rocks on the drying bank within one mile of this islet. Ŭnda do, a grass-covered islet 91 feet (27^m7) high, lies about $1\frac{1}{2}$ miles north-westward of Hambak to. A red conical buoy, surmounted by a triangle, is moored about 2 miles west-south-westward of Ŭnda do, and a similar buoy is moored nearly $2\frac{1}{2}$ miles southward of this islet. A red conical buoy, surmounted by a triangle, is moored about 3 miles south-eastward of Yuch'on gak, and marks the western end of the foul ground extending westward from Nap to. All these buoys are removed when the ice forms.

Directions.—The entrance to the main channel leading to Han gang via Sŏngmo sudo is between Sin do and U do (page 620), where there is a depth of over 10 fathoms (18^m3) in the fairway; the central peak on Sŏngmo do, bearing 057° , leads through clear of the banks which extend for over 20 miles south-westward of U do. Only small vessels with local knowledge can proceed beyond the line joining Sin do (*Lat. $37^{\circ} 31' N.$, Long. $126^{\circ} 03' E.$*) and U do, as the depths decrease north-eastward of this line, and there are numerous scattered banks.

Charts 1257, 1258.

COAST.—General remarks.—Between Yuch'on gak and Changsan got (Choppeki point), situated about 73 miles west-north-westward, the coast is irregular, with a number of deep indentations, and there are numerous off-lying islands, of which some are more than 10 miles offshore. At Changsan got, the coast turns abruptly north-north-eastward for about 30 miles to the entrance to Taedong gang (Pingyang inlet).

Chart 1258.

Coast.—Islands and dangers.—About $4\frac{1}{2}$ miles north-westward of Yuch'on gak is a point covered with grass, and about 6 cables westward of this point is Pani do, an islet 143 feet (43^m6) high; Hyŏn am, 7 feet (2^m1) high, lies about $1\frac{1}{2}$ miles south-eastward of Pani do, both being on Hannaksa. Between the point just mentioned and Changdong, a headland 140 feet (42^m7) high situated about $4\frac{1}{2}$ miles north-westward, is the entrance to a bay entirely occupied by sand and mudbanks which dry. Kujŭngsan do, 173 feet (52^m7) high, is

Charts 1256, 1262, 2347.

Chart 1258.

the north-western and highest of two islets lying near the middle of the entrance to this bay ; the south-eastern islet is called Kyongmal to, and there is a rock, above water, about 2 cables southward of it.

5 Sŏn do and Yŏryŏm do are situated, respectively, about half a mile eastward and south-eastward of Changdong ; Yŏryŏm do is 57 feet (17^m4) high. Ch'on do lies about 1½ miles westward of Changdong.

Chŏmi do (Chemii), 69 feet (21^m0) high, situated about 3½ miles westward of Changdong, is the outermost of a group of islets extending about one mile off the coast in its vicinity ; a fall on its southern side shows red.

Sand and mudbanks, which dry, and on which lie Yongmae do (Yogumai to) and several islets and rocks, extend about 4½ miles southward from Changdong, and 9 miles south-westward from Chŏmi do (Lat. 37° 50' N., Long. 125° 54' E.). Yongmae do, 330 feet (100^m6) high, lies with its north-eastern point about 2½ miles southward of Chŏmi do and has three peaks, with sandhills between them. Tongsa sŏ, 69 feet (21^m0) high, is situated about three-quarters of a mile north-eastward of the north-eastern end of Yongmae do, with 20 two islets between, the south-eastern named Kwangsa sŏ. Nam do, 52 feet (15^m8) high, lies about three-quarters of a mile westward of Tongsa sŏ. Yugŭp to, 148 feet (45^m1) high, lies about half a mile south-westward of the south-western end of Yongmae do. I do, 58 feet (17^m7) high, and U do, 129 feet (39^m3) high, are situated, 25 respectively, about half a mile southward and one mile eastward of Yugŭp to. Kakhoe do (Square islet), 33 feet (10^m1) high, lies about 4½ miles southward of Changdong. Kŏbok to, 46 feet (14^m0) high, lies about 2 miles south-westward of Chŏmi do. Ari do (Castle rock), 93 feet (28^m3) high, situated about 7½ miles south-south- 30 westward of Chŏmi do is the outermost islet.

Yŏnp'yŏng yŏlto.—Dangers.—Yŏnp'yŏng yŏlto (Yonpyon islands) is a group consisting of two islands and several islets and rocks. Soyŏnp'yŏng do (Shoyonpyon to), the southern island, is situated about 8½ miles south-westward of Ari do and has a prominent conical 35 summit, 693 feet (211^m2) high ; Kŏ do, 122 feet (37^m2) high, lies close off its south-western side. Siro do, a rock 24 feet (7^m3) high, lies close off the north-eastern point of Soyŏnp'yŏng do, and a bank, which dries, lies about 2 cables northward of this rock ; a bank, with depths of less than 3 fathoms (5^m5) over it, and one portion which 40 dries, extends north-eastward from Soyŏnp'yŏng do until it joins the mudbank which extends from the mainland.

Noun sŏ (Rorun toru), which dries 18 feet (5^m5), lies about 1½ miles southward of Ch'ongnyong du, the south-eastern point of Soyŏnp'yŏng do, and a rock, with a depth of 3 fathoms (5^m5) over it, is situated about 4 cables northward of it. A rock, with a depth of 6 feet (1^m8) over it, lies about 1½ miles westward of Soyŏnp'yŏng do.

Taeyŏnp'yŏng do (Teyonpyon to), 414 feet (126^m2) high, the larger of the two islands of the group, is situated nearly 2½ miles north-north-westward of Soyŏnp'yŏng do and is flat-topped. Kuji do 50 (Lat. 37° 38' N., Long. 125° 41' E.), an islet 138 feet (42^m1) high, lies nearly one mile southward of Taeyŏnp'yŏng do, and Kaji do, a rock 8 feet (2^m4) high, is situated nearly 1½ miles west-south-westward of Kuji do, with a 3½-fathom (6^m9) patch between. Two drying rocks lie within 3 cables of the southern end of Kuji do, and a shoal,

Charts 1256, 1262, 2347.

Chart 1258.

with a depth of $4\frac{1}{2}$ fathoms (7^m8) over it, is situated about three-quarters of a mile south-south-westward of the same position.

A bank, with depths of less than 5 fathoms (9^m1) over it, extends about $1\frac{1}{2}$ miles from the western coast of Taeyönp'yöng do and a shoal with a depth of 3 fathoms (5^m5) over it, lies about half a mile westward of its north-western extremity. Konkuro is a point lying near the middle of the western coast of Taeyönp'yöng do. A bank, with depths of less than 3 fathoms (5^m5) over it, extends about half a mile from the northern coast of the island. A similar bank extends about 2 miles east-north-eastward from Kakch'o bong, a hill situated on the north-eastern extremity of Taeyönp'yöng do, and about one mile off the south-eastern side of the island. An isolated shoal, with a depth of 2 fathoms (3^m7) over it, lies about $2\frac{1}{4}$ miles east-north-eastward of Kakch'o bong.

Yönp'yöngdo hang is an important fishing harbour on the south-eastern coast of Taeyönp'yöng do, and sand and mud flats, with some islets on them, dry out for about half a mile from Yönp'yöng-ni the village at its head; Tang do, an islet 89 feet (27^m1) high, lies about half a mile south-eastward of the village, and is connected to the coast by a breakwater. Ch'aek to, 53 feet (16^m2) high, and Moi do, 138 feet (42^m1) high, are situated, respectively, about half a mile northward and south-south-eastward of Tang do. A drying reef extends about one mile south-eastward from the southern extremity of Taeyönp'yöng do, and Yongi do, 11 feet (3^m4) high, lies at its outer end. A large fishing fleet assembles here in the season, from April to June.

Tidal streams.—About 3 miles southward of Soyönp'yöng do the tidal streams turn anti-clockwise through 360° in 12 hours, and attain their maximum rate from $2\frac{1}{2}$ to $3\frac{1}{2}$ hours after high water at Inch'ön (Admiralty Tide Tables Standard Port). Observations made during spring tides show that the stream runs southward at low water at Inch'ön with a rate of nearly $1\frac{1}{2}$ knots, eastward at $3\frac{1}{2}$ hours after low water with a rate of 2 knots, north-north-westward at high water with a rate of nearly one knot and westward at $2\frac{1}{2}$ hours after high water with a rate of nearly 2 knots.

Islands and dangers in the approach to Haeju man.—Channels.—Miryöngni do (*Lat.* $37^\circ 42' N.$, *Long.* $125^\circ 42' E.$), an islet 103 feet (31^m4) high, is situated about $1\frac{1}{2}$ miles northward of Taeyönp'yöng do, and Kalli do (Kaaryon), 168 feet (51^m2) high, with two peaks, the higher being sharp and prominent, lies about $1\frac{3}{4}$ miles west-north-westward of Miryöngni do. Some rocks, including one which dries 19 feet (5^m8), lie within half a mile southward and south-eastward of Miryöngni do, and Puam sŏ, a group of rocks which dries 15 feet (4^m6), is situated 3 cables southward of Kalli do. A rock, with a depth of $1\frac{3}{4}$ fathoms (3^m2) over it, lies nearly one mile south-eastward of Kalli do, near the middle of Tong gu, the channel between Miryöngni do and Kalli do, which is otherwise deep and clear of dangers.

Changjae do, an islet 134 feet (40^m8) high, is situated about one mile northward of Kalli do. Kwangsŏk sŏ, which dries 13 feet (4^m0), lies 4 cables northward of Kalli do, and a rock, with a depth of 3 feet (0^m9) over it, lies 3 cables further northward. Passage between Kalli do and Changjae do should not be attempted.

Charts 1256, 1262, 2347.

Chart 1258.

Hari ch'o (*Lat. 37° 46' N., Long. 125° 39' E.*) is an islet situated about $1\frac{1}{2}$ miles north-north-westward of Changjae do, with Ch'oma do, 96 feet (29^m3) high, midway between them. Sodolgarhyöp to, 5 43 feet (13^m1) high, lies close north-westward of Ch'oma do, and there are several dangerous rocks within one mile westward of the latter island. Passage between Changjae do and Hari ch'o should not be attempted.

Sö gu is a deep and clear passage about half a mile wide between 10 Hari ch'o and Yuk to, an islet situated about one mile north-westward and described below.

Light.—A light is exhibited, at an elevation of 40 feet (12^m2) from a red round concrete structure, 52 feet (15^m8) in height, on the northern extremity of Hari ch'o.

15 **Haeju man.**—**General remarks.**—Haeju man (Haiju bay) penetrates the land for over 20 miles in a northerly direction from its entrance between Yongmae do and Toksun hang, a point about 13 miles westward; Yuk to, an islet 106 feet (32^m3) high, lies about 4 cables eastward of Toksun hang, and foul ground extends for nearly 20 half a mile southward from this islet. Owing to the shoals which extend from Yongmae do to Soyönp'yöng do, the only channels leading to the bay are Tong gu and Sö gu, previously described.

Within the entrance sand and mudbanks dry out from one to 6 miles from the eastern shore of the bay, and for as much as 3 miles 25 off the western shore. A group of islands and rocks lie near the middle of the entrance to the bay, on a shoal bank connected to the eastern shore. From this group a narrow shoal bank, which dries in places, extends south-westward almost to Changjae do, and divides the entrance into two parts. There are three practicable channels 30 to the head of the bay, one eastward and two westward of the central bank; these are described below.

The eastern shore of the bay, between Chömi do (page 624) and Yongdang gak, situated about $14\frac{1}{2}$ miles north-westward, is low, except for a few hills in the northern part; the western shore is much 35 higher, and is more indented. Yongdang gak and Chinp'o gak, the northern extremity of an irregular peninsula known as Hwanghae do, which extends from the western shore, narrow the bay to a width of about 4 cables, but within these points it widens out again to an inner bay named Hwang p'o, although the greater part of this dries.

40 Local knowledge is essential for entering Haeju man.

Islands and dangers.—**Channels.**—Taesuap to lies about $6\frac{1}{2}$ miles north-eastward of Changjae do, (*Lat. 37° 44' N., Long. 125° 39' E.*); its summit, 302 feet (92^m0) high, situated on the southern side of the islet, appears like a whale's back when seen from southward, and has 45 a small group of trees on it. Drying banks surround Taesuap to, and extend up to one mile on all except the eastern and south-eastern sides; Öm do, 79 feet (24^m1) high, lies on these banks north-westward of the island. Sosuap to lies nearly $1\frac{1}{2}$ miles north-north-westward of Taesuap to and is 133 feet (40^m5) high. A bank which 50 dries in places, extends south-westward from Sosuap to to within about 2 cables of Changjae do, dividing the entrance into two parts; on this bank, and about 2 miles south-westward of Sosuap to, lies Chin ch'o, a reef which dries 9 feet (2^m7), and Chop ch'o, a rock which dries 4 feet (1^m2) lies about half a mile east-south-eastward of

Chart 1258.

Chin ch'o. Tong sudo, the channel eastward of the islets, has a bar, with a least depth of one fathom (1^m8) in the fairway, north-eastward of Sosuap to ; it is, therefore, only suitable for small vessels, but it is stated to be frequently used by coasting vessels. 5

Chungang sudo, the central channel of the three, leads between the western side of Sosuap to and Wa am, a rock 11 feet (3^m4) high situated about half a mile westward. This channel is about half a mile wide except at its northern end, where it narrows to about 1½ cables and has depths of over 5 fathoms (9^m1) in the fairway ; at its northern end the tidal streams may exceed a rate of 3 knots at spring tides. 10
Chungang sudo is separated from Sō sudo, the western channel, by a narrow middle ground which extends south-westward for about 4½ miles from Wa am.

Sō sudo runs between the above middle ground and partly drying banks extending from the western shore ; most of this channel is from half a mile to nearly one mile wide, with depths of about 8 fathoms (14^m6), but at its northern end, about one mile northward of Wa am, it is only about one cable wide, with depths of from 3½ to 4½ fathoms (5^m9 to 7^m8). 15 20

Kye do, 79 feet (24^m1) high, the largest of several islets on the drying banks on the western side of the bay, lies about 3½ miles north-north-eastward of Toksun hang. Westward of Kye do is an inlet named Pup'o hang.

Northward of Sosuap to the three channels unite and the channel up the bay widens as far as Mangun kot, a point on the western shore and about 6 miles northward of Sosuap to, and then gradually narrows. A 1½-fathom (3^m2) patch lies in mid-channel about 3½ miles south-south-eastward of Mangun kot, with a 2½-fathom (4^m1) patch 3 cables west-north-westward of it. Rocks, with a depth of 3 feet (0^m9) over them, lie about 2½ miles south-south-eastward of Mangun kot, and there are other rocks between this rock and the bank which extends from the eastern shore of the bay. Westward of these rocks and separated from them by a clear channel about 3 cables wide is the extremity of a drying spit which extends south-south-eastward from Mangun kot. A shoal, with a least depth of 1½ fathoms (2^m3) over it, lies in mid-channel eastward of Mangun kot. 30 35

Hyongje do (*Lat.* 37° 57' N., *Long.* 125° 45' E.) lies about one mile east-north-eastward of Mangun kot, with foul ground between on which are some rocks above water. A bar, with depths of less than 3 fathoms (5^m5) over it, extends across the channel just northward of Hyongje do. 40

Mangun kot is the eastern extremity of the peninsula known as Hwanghae do ; the coast between it and Chinp'o gak (page 626) is indented by two large inlets, both of which are filled by drying flats on which numerous islets and rocks are situated ; the southern inlet is called Hwanggo p'o, and the northern Pong p'o. 45

Lights.—A light is exhibited, at an elevation of 33 feet (10^m1), from a black circular concrete structure, 52 feet (15^m8) in height, situated on Chin ch'o. 50

A light is exhibited, at an elevation of 35 feet (10^m7), from a black circular concrete structure, 52 feet (15^m8) in height, situated on Hyongje do.

Tidal streams.—The tidal streams set towards and away from the

Chart 1258.

head of Haeju man on the rising and falling tides, respectively, turning at about the times of high and low water. In the western entrance, maximum rates are $2\frac{1}{2}$ knots in-going and 4 knots out-going. In the eastern entrance, about $2\frac{1}{2}$ knots, and in the area between Taesup to and Hyongje do, about $2\frac{1}{2}$ knots maximum rates are to be expected. At the northern entrance to Chungang sudo, the maximum spring rate is about 3 knots.

Haeju hang.—**Anchorage.**—**Tidal streams.**—Haeju hang, situated at the entrance to Hwang p'o at the head of Haeju man, is the port of Haeju (Haijuube), a provincial capital situated about 3 miles northward of Yongdang gak (*Lat. $38^{\circ} 00' N.$, Long. $125^{\circ} 42' E.$*). The harbour limits extend from about one mile above Hyongje do to about one mile above Yongdang gak. The town of Yongdang-ni is on the northern side of the harbour at Yongdang gak. There is a wharf opposite the Customs house at Yongdang-ni, and others were under construction in 1942 on reclaimed land between Yongdang gak and Chông do, an islet 121 feet (36^m9) high, situated about 6 cables east-south-eastward.

It is stated that there is no good anchorage near Yongdang gak ; from south-westward of Chông do up harbour, the tidal streams are reported to attain a maximum rate of about $4\frac{1}{2}$ knots, and the winds are variable, so that even when moored great caution must be observed at night. There is fair anchorage southward of Chông do, at single anchor with plenty of cable out, in depths of from $3\frac{1}{2}$ to 5 fathoms (6^m9 to 9^m1), but the bottom is rocky ; the space is so restricted that vessels must anchor in mid-channel, where the tidal streams are very strong. It is reported that the harbour freezes up from January to March.

Harbour facilities.—**Supplies.**—**Communications.**—Small vessels can berth at the wharf opposite the Custom house at Yongdang-ni. A $1\frac{1}{2}$ -ton travelling crane and a 15-ton floating crane are available. Provisions and water can be supplied.

Haeju and Yongdang-ni are connected to the Korean railway system and to the telegraph and telephone systems. There is communication by sea with Japan and with other ports in Korea.

Storm signals.—Storm signals are displayed at Yongdang-ni ; see page 28.

Trade.—In normal times, the principal exports are rice, wheat, and beans ; imports are fruit, textiles, cement, and artificial manures.

Coast.—**Islet and shoals.**—The coast between Toksun hang (page 626) and Tungsan got (Fankochi), a point situated about 14 miles west-south-westward, is indented by several bays, but they are all filled by flats which dry ; the eastern of these bays is called Kalch'ôn p'o. Kuwôlb'o gap (*Lat. $37^{\circ} 44' N.$, Long. $125^{\circ} 28' E.$*), a point surmounted by Kuwôlbong, a fairly prominent hill 711 feet (216^m7) high, is situated about midway between Toksun hang and Tungsan got.

Mu do, an islet 145 feet (44^m2) high, with some houses on its north-eastern side and a clump of trees on its summit, lies about 2 miles south-westward of Toksun hang, and there are shoals and foul ground between, including Chôp ch'o, which dries 15 feet (4^m6), and Hûk sô, 4 feet (1^m2) high, lying, respectively, about $1\frac{1}{2}$ miles northward and half a mile north-westward of Mu do. A chain of islets and rocks extends fully half a mile southward of Mu do, and include Sokpang sô,

Chart 1258.

34 feet (10^m4) high. A partly drying bank extends more than 3 miles westward from Mu do, with another similar bank parallel to it and about one mile further seaward, with a channel between them.

A 4-fathom (7^m3) patch lies nearly 2½ miles southward of Kuwob'o gap, and a 3½ fathom (5^m9) patch lies about 1½ miles south-westward of this point. Rocks and reefs extend for as much as one mile offshore in the bay between Kuwob'o gap and Tungsan got; there is a prominent group of trees on the latter point. Yonjak sō, a rock 54 feet (16^m5) high, lies about 7 cables east-north-eastward of Tungsan got and about 2 cables offshore; it is white from sea-birds' droppings. Tohang sō, 10 feet (3^m0) high, lies about 1½ miles north-north-eastward of Yonjak sō, and Tōk sō, 11 feet (3^m4) high, lies on the mudbank in a small bay between them.

Outlying shoals.—A shoal, with depths of from 4½ to 5½ fathoms (7^m8 to 10^m1) over it, extends about 3 miles south-westward from a position about 4½ miles south-south-eastward of Mu do.

A shoal, with depths of from 4½ to 6 fathoms (8^m7 to 11^m0) over it, extends about 4½ miles westward from a position about 10 miles south-south-westward of Mu do (*Lat.* 37° 44' N., *Long.* 125° 35' E.).

Sunwido myoji.—**Island and dangers.**—Tungsan got is the southern extremity of a peninsula which extends about 11 miles in a general south-westerly direction from the mainland. P'ogi got, the western point of this peninsula, is situated nearly 3 miles north-westward of Tungsan got, and between these two points shoals and rocks extend for nearly one mile offshore in places. Ch'ōm am, 40 feet (12^m2) high, lies close inshore about half a mile north-westward of Tungsan got, and foul ground, terminating in Ch'onggi sō, a rock awash, extends about half a mile south-westward from P'ogi got. The approach to Sunwido myoji lies between Tungsan got and Kari mal (Bayly bluff), the south-western extremity of Sunwi do (Suni to), situated about 6 miles westward. Sunwido myoji (Sunito anchorage) is in the channel, about 4 miles long, between the western side of the peninsula northward of P'ogi got and the eastern side of the northern part of Sunwi do; this channel is the southern part of Kangnyōng gang, an inlet which penetrates the land for about 13 miles in a north-easterly direction from P'ogi got.

Sunwi do is divided into two parts by a neck of land only about half a cable wide; each part is hilly, the south-western part being the higher. Kari mal (*Lat.* 37° 42' N., *Long.* 125° 13' E.) is a precipitous headland, and has a prominent peak on it, 614 feet (187^m1) high; Namha sō, a group of rocks, extends about 8 cables westward from Kari mal, and there are always tide-rips near it. The south-eastern coast is fringed with reefs, which extend as much as 4 cables from the south-western part of the island. A steep-to sandbank, with a least depth of 1½ fathoms (2^m7) over it, lies from 2 to 6 cables north-north-eastward of Yangt'an-yōng, the north-eastern point of the island.

There are depths of from 7 to 15 fathoms (12^m8 to 27^m4) in Sunwido myoji, and the anchorage is sheltered from all but southerly and south-westerly winds. The width of the channel varies from about a quarter of a mile to half a mile between the 3-fathom (5^m5) lines.

Dangers in the approach to Sunwido myoji.—**Light-buoy.**—Ong do (Tokudoru) is a group of rocks lying about 5½ miles south-westward

Chart 1258.

of Tungsan got, one of which is 11 feet (3^m4) high, and the remainder dry ; another group of drying rocks lies about 6 cables further westward. A group of rocks, which dries from 6 to 17 feet (1^m8 to 5^m2),
 5 lies nearly 1½ miles southward of Ong do and is the outermost danger in this vicinity.

Sanae do, lying about 1½ miles westward of Tungsan got, is a small grassy sand cay ; a reef, which dries, extends about 3 cables south-westward from it. There is foul ground, with some rocks which dry,
 10 within a distance of one mile southward of Sanae do, and also between Sanae do and Pong do, a rock above water situated about one mile south-westward. Reefs, including Ûn sô, a rock above water, and rocks which dry, lie about one mile south-westward of Tungsan got with a channel about 2 cables wide between ; between these reefs
 15 and Sanae do is a deep passage, except for Apchon, a rock which dries 6 feet (1^m8), lying in mid-channel and about 7 cables south-eastward of Sanae do.

Yohyông ch'ôllœ is a large shoal lying about midway between Tungsan got and Kari mal ; it has depths of less than 3 fathoms
 20 (5^m5) over it, but its shoalest spots are dry.

Suya sô is a rock awash lying fully 1½ miles west-south-westward of P'ogi got and about three-quarters of a mile off the south-eastern coast of Sunwi do ; this rock is marked by a light-buoy, painted red and black in horizontal bands, exhibiting a *white flashing light every*
 25 *three seconds.*

Tidal streams.—The tidal streams between Soyônpyông do and Tungsan got run eastward with the rising tide and westward with the falling tide, turning at about half an hour after the time of high and low water at Inch'ôn (Admiralty Tide Tables Standard Port).
 30 Westward of Tungsan got the tidal streams follow the direction of the coast and run north-westward and south-eastward, the former running from about 3½ hours after low water till about 3½ hours after high water, and the latter from about 3½ hours after high water till about 3½ hours after low water at Inch'ôn.

Observations made during spring tides in a position 11 miles south-south-eastward of Kari mal show that the direction of the tidal streams there alter 360° against the hands of a clock in 12 hours, the direction and rates being as follows :—Half an hour after high water at Inch'ôn north-north-westward 1·1 knots ; 3½ hours after high
 40 water, westward 1·4 knots ; 6 hours before high water, south-south-eastward 1·1 knots, 3 hours before high water, eastward 1·4 knots. Observations made at spring tides in a position 17 miles south-south-westward of the same point showed the same phenomenon, the direction and rates being as follows :— Half an hour after high water,
 45 north-north-westward 0·8 knots ; 3½ hours after high water, west-south-westward 1·4 knots ; 6 hours before high water, south-south-eastward 0·8 knots ; 3 hours before high water, east-north-eastward 1·4 knots.

Directions.—All the channels leading to Sunwido myoji require
 50 caution and local knowledge, as they are narrow and the tidal streams are strong and irregular. The channel eastward of Yohyông ch'ôllœ can be entered between Sanae do (*Lat. 37° 40' N., Long. 125° 19' E.*) and the patch of foul ground including Ûn sô, but Apchon, situated in mid-channel, must be avoided.

Charts 1256, 1262, 2347.

Chart 1258.

The western channel, between Sunwi do and Yohyŏng ch'ŏlloe, is the one generally used. From eastward, a vessel should pass southward of Ong do, or between Ong do and the foul ground which extends nearly one mile southward from Sanae do, and then steer for the south-western extremity of Sunwi do. When the hillock on P'ogi got bears 062°, course should be altered to keep it on this bearing, which leads about 1½ cables south-eastward of the reefs extending from the south-western part of the south-eastern coast of Sunwi do, and about the same distance south-eastward of Suya sŏ. When Tungsan got bears 132°, course should be altered to 034° so as to proceed in mid-channel to the anchorage.

Kangnyŏng gang.—Islands and dangers.—Storm signals.—Cables.—Beacons.—The depths in Kangnyŏng gang for about 4 miles north-north-eastward of the northern extremity of Sonwi do vary between 7 and 10 fathoms (12^m8 and 18^m3), and the width of the channel is not less than half a mile; care must be taken, however, to avoid the sandbank which lies north-north-eastward of Yangt'an-yŏng (page 629).

Yongho do (Yonger to) is the south-westward and largest of a chain of four islands, lying on the north-western side of the fairway and extending about 4½ miles north-eastward from a position about three-quarters of a mile north-westward of Yangt'an-yŏng. Yongho do is 345 feet (105^m2) high at its northern end. Yonghodo-ri is situated on the eastern side of the southern end of Yongho do, which is 202 feet (61^m6) high, and almost detached from the rest of the island; there is good anchorage, in depths of from 6 to 8 fathoms (11^m0 to 14^m6), sand and mud, off this village. Yŏngdŭk sŏ, a reef which partly dries, lies in mid-channel between the northern extremity of Sunwi do and Yongho do. Storm signals are displayed at Yonghodo-ri; see page 28. Mup'a-ri, a village on the northern end of Yongho do, is connected to Sagon-ni, on the mainland north-westward, by a submarine telegraph cable, which is marked by beacons at each end; see page 37. The three northern islands are named P'a do, Kunman do, and Sin do, in that order, from south to north. Fishing stakes are to be found around these islands from September to May.

Taeu do, 106 feet (32^m3) high, lies on the mudbank on the eastern side of the channel about 3 miles north-eastward of Yangt'an-yŏng, with Sou do close off its southern end.

Wi do, 329 feet (100^m3) high, lies in mid channel about 5 miles north-eastward of Yangt'an-yŏng; passage northward of this island is encumbered with drying banks.

Above Wi do the inlet opens out into a large basin of irregular shape with four principal arms, all of which are largely filled by drying flats.

Coast.—Islets and dangers.—The peninsula which forms the north-western side of Kangnyŏng gang is much indented and is fringed by mud flats which dry. Chŏng do (*Lat.* 37° 49' N., *Long.* 125° 13' E.), an islet 155 feet (47^m2) high, lying close off the western extremity of the peninsula, is situated about 6 miles north-westward of the north-eastern end of Sunwi do. Kujui, a bank which dries, extends about 1½ miles offshore westward of Yongho do. Naedaebae do, 33 feet (10^m1) high, situated about 1½ miles south-eastward of Chŏng do, is one of a group of islets lying on the mud flats, and foul ground extends

Charts 1256, 1262, 2347.

Chart 1258.

about one mile southward and three-quarters of a mile south-westward from it. Between Chŏng do and a point situated about 4 miles north-westward is the entrance to a large bay which mostly dries.

- 5 The north-western entrance point of this bay is the eastern entrance point of an inlet named Ongjin hang, which penetrates the land in a northerly direction; the village of Sogang-dong (Onjin) is situated on the eastern side of this inlet. There is a narrow channel between the banks extending from this part of the coast and those on which
10 Ōhwa do (Erha to) and Ch'angin do (Chanrin to) described below, are situated; this channel, which is entered about 2 miles westward of the entrance to Ongjin hang, is used by local sailing craft plying between Kangnyong gang and Chinnanp'o.

- The coast between the western entrance point of Ongjin hang and
15 the southern entrance point of Taedong man (Tatong bay), situated nearly 9 miles west-north-westward is fringed by reefs in places.

- Mahap to (Tomahabu), which lies off the southern entrance point of Taedong man, is described on page 635. A $2\frac{1}{2}$ -fathom (4^m6) patch lies about one mile south-south-eastward of Mahap to, with a
20 $3\frac{1}{2}$ -fathom (6^m9) patch between them.

- Off-lying islands and dangers.—Islands and banks north-westward of Sunwi do.**—Ōhwa do (Erha to), 251 feet (76^m6) high, lies with its southern extremity about $2\frac{1}{2}$ miles north-north-eastward of Kari mal and about half a mile off the north-western coast of Sunwi do; mud
25 and sand banks, which dry, extend about 3 miles north-eastward from this island, and form the north-western side of a deep channel which leads to the anchorage off Yonghodo-ri (*Lat. $37^{\circ} 47' N.$, Long. $125^{\circ} 20' E.$*); the eastern end of these banks is called Kobundol, the centre Chungduji, and the western end Sangduji. The south-
30 western entrance to this channel lies between the foul ground extending westward from Kari mal and a drying patch lying about 7 cables north-westward of Kari mal, at the southern end of a bank, with depths of less than 3 fathoms (5^m5) over it, which is separated from Ōhwa do by a channel from $1\frac{1}{2}$ to 4 cables wide. Hwang am, a rock
35 with a depth of $1\frac{1}{2}$ fathoms (2^m3) over it, lies about half a mile north-eastward of the northern extremity of the south-eastern end of Ōhwa do and nearly in mid-channel. In the north-eastern entrance of the channel is Yŏngdŭk sŏ (page 631).

- Ch'angin do (Chanrin to), 278 feet (84^m7) high, lies about 3 miles
40 north-westward of Ōhwa do, and is almost connected to it by sandbanks with depths of less than 3 fathoms (5^m5) over them; a drying patch lies about $1\frac{1}{2}$ miles northward of Ōhwa do, and a rock awash was reported, in 1952, about one mile further north-westward. Another sandbank extends northward and north-westward from the
45 northern side of Ch'angin do to within about half a mile of the mainland, and forms the southern and western sides of the western end of the inshore channel.

- A reef, which dries, extends about $1\frac{1}{2}$ miles from the western point of Ch'angin do, and on this reef are three islets, the outermost
50 having a flat top 98 feet (29^m9) high; there are always tide-rips outside this islet. Haeam do (*Lat. $37^{\circ} 50' N.$, Long. $125^{\circ} 12' E.$*), an islet 94 feet (28^m7) high, is connected to the northern point of Ch'angin do by a sand spit which dries.

Off-lying islands and dangers.—Piap to (Piyobu somu), situated

Charts 1256, 1262, 2347.

Chart 1258.

about $5\frac{1}{4}$ miles south-south-westward of the southern point of Ch'angin do, is a serrated, rocky islet, 174 feet (53^m0) high, well defined from eastward. Rocks and shoals lie within a distance of about one mile south-eastward and eastward of this islet, and a shoal extends about 3 cables northward from it. A rock, with a depth of less than 6 feet (1^m8) over it, lies about 2 miles eastward of Piap to, and close to this rock are two rocks, with depths of $1\frac{1}{4}$ and $1\frac{3}{4}$ fathoms (2^m7 and 3^m2) over them, respectively; these rocks are plainly marked by eddies when the tidal streams are at their strength. Vessels should not attempt to pass between the rocks and Piap to. 5 10

Kirin ju, a bank with depths of from 3 feet (0^m9) to 3 fathoms (5^m5) over it, extends nearly 6 miles north-westward from a position about one mile northward of Piap to; vessels should not attempt to pass between the south-eastern end of this bank and Piap to. 15

Kirin do (Kerrin to), situated about $7\frac{1}{4}$ miles north-north-westward of Piap to, consists of two hilly parts connected by a neck of low land; it is separated from the mainland by a deep channel fully 2 miles wide. Shoals and rocks extend as much as 6 cables from the eastern side of Kirin do; a bay on the north-western side is entirely occupied 20 by a bank which dries, and there are depths of less than 3 fathoms (5^m5) for a further mile outside this bank. A detached shoal, with a least depth of one fathom (1^m8) over it, lies about one mile northward of the island.

Hagi do consists of three rocks, the highest being 108 feet (32^m9) 25 high, situated on a reef which extends nearly $1\frac{1}{4}$ miles west-south-westward from a position about $1\frac{1}{4}$ miles westward of the western point of Kirin do; there are other rocks, above water and awash, on this reef. There are always heavy tide-rips in the passage between this reef and Kirin do, and it should not be used. 30

Tidal streams.—The tidal streams from off Sunwi do to the entrance of Taedong man run between west and north-west, and between east and south-east; the maximum rate is about $3\frac{1}{4}$ knots. The stream which comes from eastward divides into two parts at Piap to; the inshore stream flows past the outer end of Ch'angin do, passes either 35 side of Kirin do, and thence along the eastern side of Chung ju (page 635); the offshore stream flows westward of Kirin ju and then divides into two branches, one flowing between Hagi do and Chung ju, and the other passing westward of Chung ju.

Taech'öng kundo.—**Dangers.**—**Anchorage.**—Taech'öng kundo 40 (Techong group) consists of three islands, the southernmost of which, named Soch'öng do (Shosei to), lies about 11 miles westward of Kirin do; these islands are sparsely populated, but they are frequented each year by fishing vessels from Yen-t'ai and the northern part of the eastern coast of China. 45

Soch'öng do (*Lat.* $37^{\circ} 46' N.$, *Long.* $124^{\circ} 45' E.$) is 579 feet (176^m5) high; its south-eastern point consists of white cliffs, and a rock, 60 feet (18^m3) high, lies about 2 cables eastward of it. A rock, 4 feet (1^m2) high, lies about 3 cables east-north-eastward of the north-eastern point, and two rocks above water lie within half a mile southward of the south-western point of the island. A shoal, with a depth of 5 fathoms (9^m1) over it, lies about one mile offshore on the northern side of the island. Soch'öng do is stated to afford the only shelter in this neighbourhood during the northerly gales of winter. Soch'- 50

Chart 1258.

öng ju, with a least depth of $2\frac{1}{2}$ fathoms (4^m1) over it, lies about 2 miles east-south-eastward of the south-eastern point of Soch'öng do and on the northern end of a bank, with depths of less than 5 10 fathoms (18^m3) over it, which extends about $3\frac{1}{2}$ miles southward from this shoal; about 2 fathoms (3^m7) less water than charted was reported on this bank in 1952.

Taech'öng do (Techong to) is situated nearly $2\frac{1}{2}$ miles north-westward of Soch'öng do, and its summit, 1,133 feet (345^m3) high, 10 situated in the southern part of the island, appears conical when seen from westward; see views facing page 638. The coasts are mostly clifty; the middle part of the southern coast is precipitous, but the north-eastern coast is a white sandy beach. Two rocks, which dry 4 feet (1^m2), lie about 6 cables northward of the north-eastern end of 15 the island. A shoal, with depths of less than 3 fathoms (5^m5) over it and one portion which dries, extends fully 3 miles north-westward from the north-western side of Taech'öng do. Kapchuk (Barren islet), a rock 148 feet (45^m1) high and precipitous on its western side, lies about one mile westward of the southern extremity of Taech'öng 20 do; Sogapchuk, a rock 17 feet (5^m2) high, lies about a quarter of a mile northward of Kapchuk. Sönjin p'o, a small bay with a shingle beach on the eastern side of Taech'öng do, affords anchorage, in depths of from $5\frac{1}{2}$ to 9 fathoms (10^m5 to 16^m5), sand, with the eastern extremity of Paengnyöng do (see below) in line with the 25 north-eastern point of Taech'öng do, bearing about 006° ; this anchorage is sheltered from winds from between south-west and north, and also from heavy seas from southward, by Soch'öng do. There are two villages on the shore of the bay.

Paengnyöng do (Pengyong to) lies with its southern extremity 30 about 4 miles northward of Taech'öng do, and is the northernmost and largest of the group. Its summit (*Lat.* $37^\circ 58' N.$, *Long.* $124^\circ 40' E.$), situated in the middle of the northern part of the island, has a flat top 605 feet (184^m4) high, and is easily identified from south-eastward. The north-western part of the island is thickly wooded, 35 with cliffs about 500 feet (152^m4) high along the coast; Söndae am (Finger rock), 185 feet (56^m4) high, is situated close off the north-western point, and Chinese junks frequently shelter, from all except northerly winds, in the small cove immediately eastward of this point. Vessels should give the northern coast a wide berth, as a reef, with a 40 least depth of $4\frac{1}{2}$ fathoms (8^m2) over it, lies about one mile offshore, and there are several rocks within a distance of about 2 cables from the coast, and some rocks, 4 feet (1^m2) high, lie about half a mile off-shore at the eastern end. Yöñ bong (Middle rock) consists of two prominent rocks lying close together and about $1\frac{1}{2}$ miles southward of 45 the southern point of Paengnyöng do; the southern rock is 65 feet (19^m8) high and peaked, whilst the northern has a rounded summit 40 feet (12^m2) high. Sunken rocks and rocks which dry lie within one mile northward and southward of Yöñ bong. Shoals, with depths of less than 5 fathoms (3^m2 to 9^m1) over them, extend about $2\frac{1}{2}$ miles 50 west-north-westward and $1\frac{1}{2}$ miles eastward from Yöñ bong. The eastern coast of Paengnyöng do is indented by a bay which dries entirely. Yanggiwön san (East bluff), the eastern point of the island, rises precipitously to an isolated hill, and Chöng am, a rock 11 feet (3^m4) high, lies about half a mile off the south-eastern extremity. A

Charts 1256, 1262, 2347.

Chart 1258.

bank, with depths of less than 5 fathoms (9^m1) over it, extends about 3 miles south-eastward from the south-eastern side of Paengnyŏng do, with a depth of $2\frac{3}{4}$ fathoms (5^m0) at its outer extremity. Paengnyŏng ju is a narrow sandbank, with depths of from $1\frac{1}{2}$ to 3 5 fathoms (2^m7 to 5^m5) over it, which extends about $5\frac{1}{2}$ miles south-south-eastward from a position about $1\frac{1}{4}$ miles southward of Yang-giwŏn san.

Light.—Fog signal.—Radiobeacon.—A light is exhibited, at an elevation of 267 feet (81^m4), from a white circular concrete tower, 10 42 feet (12^m8) in height, situated on the south-western extremity of Soch'ŏng do. A fog signal is sounded from the lighthouse (*Lat.* $37^{\circ} 45' N.$, *Long.* $124^{\circ} 44' E.$), and there is a radiobeacon.

Tidal streams.—The tidal streams near Taech'ŏng kundo in general flow northward or southward, the maximum rate being from 3 to 15 $4\frac{1}{2}$ knots; the north-going stream runs from about 3 hours before to 3 hours after the time of high water at Inch'ŏn (Admiralty Tide Tables Standard Port), and the south-going stream from about 3 hours after high water to 3 hours before the next high water. In the channel between Soch'ŏng do and Taech'ŏng do the tidal streams 20 run north-eastward and south-westward; in the channel between Taech'ŏng do and Paengnyŏng do they run north-westward and south-eastward.

In thick weather it is important to remember that the tidal streams may be modified by currents caused by previous wind, 25 especially if the latter has been strong and blowing in roughly the same direction for a day or more.

Islet and banks between Paengnyŏng do and the mainland.—Wŏllae do (Getsnaitau), 201 feet (61^m3) high, lies about 6 miles north-eastward of the north-eastern point of Paengnyŏng do and 30 about $2\frac{1}{2}$ miles offshore; foul ground extends about half a mile from its northern side.

Chung ju, a bank with depths of less than 10 fathoms (18^m3) over it, extends nearly 14 miles south-south-eastward from a position about one mile westward of Wŏllae do. The shoalest part of this bank is 35 near the southern end, where there is a depth of three-quarters of a fathom (1^m4); nearly 3 miles southward of Wŏllae do (*Lat.* $38^{\circ} 03' N.$ *Long.* $124^{\circ} 49' E.$) there is a $1\frac{1}{4}$ -fathom (2^m3) patch, and between these two shoal parts there are depths of not less than $5\frac{1}{4}$ fathoms (9^m6) on the bank. Under ordinary conditions Chung ju is not easily 40 discerned, as the water is uniformly discoloured, but when a sea gets up it can easily be located on account of the breakers.

Sibisa ju (Niki se) is a continuation of Chung ju, and extends about $7\frac{1}{2}$ miles west-north-westward from a position about one mile westward of Wŏllae do; the depths over it vary from $1\frac{1}{2}$ to 6 fathoms 45 (3^m2 to 11^m0). There is a deep channel, not less than three-quarters of a mile wide, between Sibisa ju and the coast northward.

Pan ju (Iwa se) is a bank, with depths of less than 5 fathoms (9^m1) over it, which extends nearly 2 miles east-south-eastward from a position about 6 cables eastward of Wŏllae do; the least depth on 50 this bank is $1\frac{1}{2}$ fathoms (2^m7).

Taedong man.—Islands and dangers.—Mahap to (Tomahabu), 363 feet (110^m6) high, is situated about $9\frac{1}{2}$ miles south-eastward of Wŏllae do and there is only a narrow boat passage between it and the coast

Chart 1258.

- eastward ; there are two peaks in the southern part of this islet, one being covered with pine trees and the other bare. Taedong man (Tatong bay) is entered between Mahap to and Yuk (Sonjon) to, a flat-topped islet, 111 feet (33^m8) high, lying about 8½ miles northward and joined to the mainland by a sandbank which dries. The bay extends about 16 miles eastward from its entrance, and Kwangt'on ch'ŏn (Tatong river) discharges into its head through flat cultivated plains ; the inner part of the bay is largely filled by drying flats.
- 10 There are several dangers on or near a line joining Mahap to and Yuk to. Sodoru ch'o (reef), a rock 4 feet (1^m2) high, lies about 2½ miles north-westward of Mahap to, and a rock, which dries 8 feet (2^m4), lies about one cable eastward of it. Taedong ju (Daitoshu) is a sandbank, with depths of from 3 to 5 fathoms (5^m5½ to 9^m1) over it, which lies about midway between Sodoru ch'o and Yuk to. There are other shoals eastward of the above, with depths of from 2½ to 5 fathoms (4^m6 to 9^m1) over them ; their positions can best be seen from the chart. Ojak to, 52 feet (15^m8) high, is one of several rocks close westward of Yuk to.
- 20 Kumijon sŏ (yo), a reef which dries 5 feet (1^m5), lies about 1½ miles south-south-eastward of Fort point, a promontory, with a hill 60 feet (18^m3) high on it, situated nearly 3½ miles eastward of Yuk to. A patch which just dries, and a 2-fathom (3^m7) patch, lie, respectively, about half a mile north-north-westward and three-quarters of a mile south-south-westward of Kumijon sŏ.

Mokton man (Bokudo bay) is situated between Yuk to and Fort point.

- Kumi p'o is a small bay on the eastern side of Fort point. It is a summer resort for Europeans, and their coloured houses on the promontory make it easy to identify the place.

Sangka sŏ (Sanga yo), which dries 9 feet (2^m7), lies about 3 miles south-eastward of Kumijon sŏ, and foul ground extends about one mile eastward from it.

- Anchorage.—Tidal streams.—Directions.**—Good anchorage, in depths of from 4 to 5½ fathoms (7^m3 to 10^m1), sand and mud, can be obtained off Kumijon sŏ. Eastward of this reef the bay shoals to 3 fathoms (5^m5) and less.

- Small vessels can anchor, in depths of from 3 to 4 fathoms (5^m5 to 7^m3), good holding ground, off the entrance to Kumi p'o. The tidal streams set eastward with the rising tide and westward with the falling tide, but they are not strong.

- A vessel bound for the anchorage in Kumi p'o from southward should steer a mid-channel course through the channel which is bounded westward by Soch'ong ju and Paengnyŏng ju, and eastward by Kirin ju and Chung ju. When the summit of Mahap to (*Lat.* 37° 55' N., *Long.* 124° 58' E.) bears 070°, course should be altered to pass about half a mile north-westward of Sodoru ch'o, thence steering about 034° for the anchorage. At night or in thick weather, if the land cannot be made out, vessels are advised to make for Changsan got (Choppeki point), a headland situated nearly 9 miles northward of Paengnyŏng do, passing outside Taech'ŏng kundo, and then proceed as directed hereafter for a vessel from northward.

A vessel from northward or westward should pass between Sibisa ju and the mainland northward, holding the northern side of the

Chart 1258.

channel; thence pass about half a mile southward of Yuk to, and steer an easterly course for the anchorage.

Charts 1257, 1258.

Coast.—Islets and dangers.—Tidal streams.—From the vicinity of Yuk to, the coast trends generally westward for about 13 miles to Changsan got (Choppeki point), which is the most prominent headland on the western coast of Korea. Ku am (Kiofuk gan), a rock 21 feet (6^m4) high, lies close inshore about 4½ miles east-south-eastward of Changsan got. There is a rock 135 feet (41^m1) high, named Taegam am (Daigan do), close off Changsan got; about one cable westward of this rock is a rock awash. T'aesan bong (Taisan hoa), situated about 5½ miles eastward of Changsan got, is 1,257 feet (383^m1) high and is the highest peak in this vicinity. See view facing page 638. The tidal streams off Changsan got run northward with the rising tide and southward with the falling tide, the maximum rate being from 5 to 7 knots.

Chart 1257.

Between Changsan got and Oryuji gi (Gorinchiki), situated about 16 miles north-eastward, is a bight with sandy beaches; between these beaches and the hilly ranges a few miles inland is a belt of cultivated land, with scattered villages. The land within Oryuji gi rises steeply to Kwangsök san (Mount Toarei), a peak 1,300 feet (396^m2) high, situated about 1¼ miles eastward of the point. Monggüm p'o, an inlet which dries except for a narrow channel, is entered about 7 miles north-eastward of Changsan got. There are several islets and rocks off its entrance; among these are Tae do (Dai tau) and Monggüm do (Moakin), each 150 feet (45^m7) high; the former lies about 3 cables offshore and is covered with grass; Sök to, consisting of some rocks from 20 to 30 feet (6^m1 to 9^m1) high, lies close off the western end of Tae do. A 3½-fathom (6^m4) patch lies about 4 cables northward of the eastern extremity of Tae do. Monggüm p'o is much frequented by junks; there is a regular launch service with Chinnanp'o. Storm signals are displayed at Monggümp'o-ri, a village on the southern side of this inlet; see page 28. Namdae ch'ön, an inlet which penetrates the land in a south-easterly direction, is entered about 6 miles north-eastward of Tae do, and is available for small vessels only; Taech'o an, a bank which dries, extends about one mile northward from its southern entrance point.

Charts 1656, 1257.

The coast for about 4 miles north-eastward of Oryuji gi is hilly, but thence to Yöngjöng gi (Reisei saki), a further 9 miles north-eastward, it is low and cultivated. A shoal, with a depth of 2½ fathoms (4^m6) over it, lies about three-quarters of a mile offshore about 7 miles north-north-eastward of Oryuji gi, and the 3-fathom (5^m5) line extends one mile offshore in places between them.

Chart 1656.

Between Yöngjöng gi and Chöp to, an islet 37 feet (11^m3) high, situated about 4 miles south-south-westward, the coast recedes and forms a shallow bay. Between Yöngjöng gi and Pip'a got (Biwa kan), situated about 3½ miles northward, the hills approach the coast again.

The dangers off the coast between Chöp to and Pip'a got are described with Ch'odo sudo (Chotō suidō) on page 639.

Charts 1256, 1262, 2347.

Chart 1257.

Off-lying banks.—**Buoy.**—Chang ju (Choppeki dashi) is a narrow bank, with depths of from $1\frac{1}{2}$ to $5\frac{1}{2}$ fathoms (2^m7 to 10^m5) over it, which extends about 13 miles northward from a position about $5\frac{1}{2}$ miles north-north-eastward of Changsan got (*Lat.* $38^\circ 08' N.$, *Long.* $124^\circ 39' E.$). A buoy, painted in red and white horizontal bands, with a triangular topmark, is moored near the northern end of the eastern side of Chang ju.

Charts 1656, 1257.

- 10 I ju (Ri shū), with depths of from a quarter of a fathom to 5 fathoms (0^m5 to 9^m1), extends about 6 miles northward from a position about 2 miles south-westward of the northern end of Chang ju. A detached 4-fathom (7^m3) patch lies off the eastern side of I ju about 2 miles north-north-eastward of its southern extremity,
15 and a detached 3-fathom (5^m5) patch lies about half a mile north-westward of its northern end.

Chart 1656.

- APPROACHES TO TAEDONG GANG.**—**Caution.**—Owing to extensive shoaling on the banks in the approaches to Taedong gang
20 (Pingyang inlet), chart 1656 must be used with caution.

Charts 1656, 1257.

- Ch'o do.**—**Islets and dangers.**—**Buoy.**—Ch'o do (Cho tō), a large island, 1,145 feet (349^m0) high, lies south-westward of the mouth of Taedong gang, with Hūibong gap (Kiho kō), its eastern extremity,
25 about 6 miles south-westward of Pip'a got.

- Oe ju (Gai shū), a shoal, with depths of less than 3 fathoms (5^m5) over it, extends as much as 3 miles from the southern side of the island, and a ridge, with depths of from three-quarters of a fathom to $3\frac{1}{4}$ fathoms (1^m4 to 5^m9) extends about 5 miles south-westward from a
30 position about $1\frac{1}{4}$ miles west-south-westward of Hūibong gap. A red spherical buoy marks the south-western extremity of the ridge and between the northern extremity of the ridge and Ch'o do is a channel about $2\frac{1}{2}$ cables wide with a depth of about $4\frac{3}{4}$ fathoms (8^m7) in it. Two detached $3\frac{1}{4}$ -fathom (5^m9) patches and a $4\frac{3}{4}$ -fathom (8^m7) patch
35 lie within about one mile eastward of the southern part of the ridge; their positions can best be seen on chart 1257.

Chart 1656.

- Sōk to (Seki tō), 60 feet (18^m3) high, Mubul sō (Bubutsu shō), 112 feet (34^m1) high, and Kūm do (Ko tō), 110 feet (33^m5) high, are islets
40 close to the southern coast of Ch'o do, and Kot to (Kwan tō), 173 feet (52^m7) high, lies close off its south-western point.

- Tōk to (Hoku tō), 336 feet (102^m4) high, lies about half a mile north-westward of Puk to (Hok kaku), the northern point of Ch'o do, with Chōngjōk to (Teisoko tō), 222 feet (67^m7) high, between them.
45 Sō do (Sei tō), 292 feet (89^m0) high, lies nearly $2\frac{1}{4}$ miles south-westward of Tōk to and about 8 cables north-westward of Ch'u bi (Sagigi hana), a point on the western coast of Ch'o do. See view facing this page.

- Sosa gi (ki) is a point situated about $2\frac{1}{2}$ miles north-westward of
50 Hūibong gap. Myōng do (Mei tō), 43 feet (13^m1) high, lies about half a mile offshore about $1\frac{1}{2}$ miles north-westward of Sosa gi, and a bank, with less than 3 fathoms (5^m5) over it, extends about three-quarters of a mile offshore between them.

Charts 1256, 1262, 2347.



Summit bearing 023° , 25 miles.



Summit bearing 091° , 13 miles.
Two views of Taech'ông do (Techo to).



T'aasan bong (Taisan hood),
bearing 107° , 35 miles.

Ch'āngsan got (Choppeki point).



Tôk to
(Hoku tô).

Sô-do (Sri-tô) lighthouse, bearing
 081° , distant $5\frac{1}{4}$ miles.

Ch'ô do (Cho tô).

S.W. extremity of Ch'ô do.

Approach to Taedong gang (Pingyang inlet).

Chart 1656.

Light.—Fog signal.—A light is exhibited, at an elevation of 308 feet (93^m9), from a white circular concrete tower, 32 feet (9^m8) in height, situated on the summit of Sŏ do (*Lat. 38° 33' N., Long. 124° 46' E.*). A fog signal is sounded from the lighthouse. 5

Ch'odo sudo.—Dangers.—Ch'odo sudo (Chotō suidō), lying between Ch'o do and the mainland, can be used by vessels from southward proceeding to Taedong gang. On the eastern side of the channel and about 3½ miles south-eastward of Hūibong gap is a point 41 feet (12^m5) high; Chŏp to (page 637), lies about 4 cables northward of this point, and within a distance of 6 cables northward of this islet are some rocks which dry. A rocky ledge, with some small islets on it, extends about half a mile westward from Yŏngjŏng gi, and there are several sunken rocks and rocks which dry within a distance of one mile westward and 1½ miles north-westward of this point; a shoal, with a least depth of 2 fathoms (3^m7) over it, lies about 1½ miles south-westward of Yŏngjŏng gi. Maengam do (Mogan tō) lies close inshore about one mile northward of Yŏngjŏng gi, and Songgot (Shokwan), which dries, extends about three-quarters of a mile offshore about one mile further northward. Pip'a got (Biwa kan), lying on the eastern side of the northern entrance to Ch'odo sudo, is a headland 155 feet (47^m2) high; Hug am (Koku gan), a rock 14 feet (4^m3) high, lies about 2 cables north-westward of it. A rocky shoal, with a least depth of 3½ fathoms (6^m4) over it, lies with its western extremity nearly one mile south-westward of Pip'a got, and overfalls occur near it. Ho do (Ko tō) 174 feet (53^m0) high, is an islet lying about half a mile north-eastward of Pip'a got, and shoal ground, on which lies a rock above water, extends about half a mile off its western side; Sŏ am (So gan), a rock 2 feet (0^m6) high, lies about 2 cables off the northern point of Ho do. 25

The western side of Ch'odo sudo is bounded by Nae ju (Nai shū), 30 a bank, with depths of less than one fathom (1^m8) over much of its area, which extends about 4 miles northward from a position about one mile north-eastward of Hūibong gap; the southern end of this shoal dries, and there is a depth of 5 feet (1^m5) near its northern extremity. Songmun am (Shomon gan), a white rock 6 feet (1^m8) 35 high, lies about midway between Hūibong gap and the southern end of Nae ju; a rock, which dries 12 feet (3^m7), with another rock which dries close south-westward of it, lies nearly 4 cables north-eastward of Songmun am, and there are overfalls near them.

Pansŏng ch'o (Banjō shō) is a rock, with a depth of 4 feet (1^m2) over 40 it, lying in mid-channel and about 2 miles westward of Yŏngjŏng gi. Sokpuk kak (Sekihoku kaku), the northern extremity of Sŏk to (Seki tō), described on page 340, in line with Hug am, bearing 017°, leads nearly half a mile westward of Pansŏng ch'o. The fairway between Pansŏng ch'o and Nae ju is fully one mile broad, with depths of over 45 6 fathoms (11^m0). A 5½-fathom (9^m6) patch lies about 2 miles northward of Pansŏng ch'o (*Lat. 38° 32' N., Long. 124° 57' E.*).

Shoals northward of Ch'o do.—Buoy.—Tong ju (Higashino su), a bank with depths of less than 5 fathoms (9^m1) over it, extends about 27 miles north-north-eastward from a position about 4½ miles northward of Sŏ do; in places there are depths of less than 6 feet (1^m8) on this bank. In 1933 it was reported that the depths on this bank, in a position from 11 to 12 miles north-north-eastward of Sŏ do, had decreased considerably. 50

Chart 1656.

A shoal, with a depth of 10 fathoms (18^m3) over it, lies about 7½ miles north-westward of Sō do, and, in 1945, shoaler depths were reported to extend about 2½ miles north-north-eastward from this position. In 1933, the *Kankyo maru* reported a depth of 12 fathoms (21^m9) about one mile east-south-eastward of the above 10-fathom (18^m3) shoal.

Ha ju (Ka shū), a bank with depths of from one foot (0^m3) to 3 fathoms (5^m5) over it, extends about 5 miles north-eastward from the northern extremity of Ch'o do, from which it is separated by a deep but narrow channel ; a shoal, with a depth of 1½ fathoms (2^m7) over it, was reported, in 1953, near the middle of this channel, and about one mile south-eastward of Tōk to. Ha ju forms the southern side of the main channel leading to the entrance of Taedong gang. A red conical buoy is moored off the north-eastern end of Ha ju.

Chung ju (Chū shū), a bank on the northern side of the main channel, has depths of from 3 feet (0^m9) to 3 fathoms (5^m5) over it, and extends about 5 miles north-eastward from a position about 4½ miles north-eastward of the northern extremity of Ch'o do. The channel between the northern end of Ha ju and the southern end of Chung ju is about one mile wide. The north-eastern end of Chung ju is within about one mile of the south-western extremity of the partly drying spit which extends about 4 miles south-westward from Tōk to (Toku tō), a prominent islet, covered with grass and 284 feet (86^m6) high, situated nearly 9½ miles northward of Pip'a got ; considerably less water was reported, in 1952, in the gap between Chung ju and this spit.

Sōk to.—Off-lying islets and shoal.—Light.—Fog signal.—Radio station.—Sōk to (Seki tō) lies with Nam gak (Nan kaku) (Lat. 38° 37' N., Long. 124° 59' E.), its southern extremity, about 2 miles north-north-eastward of Pip'a got and on the southern side of the main entrance channel of Taedong gang ; this island is 431 feet (131^m4) high and joined to the mainland eastward by a bank, with depths of less than 3 fathoms (5^m5) over it, which forms the southern side of the main channel.

Chemae do (Shimai tō) consists of two islets, connected by a rocky ledge, lying about a quarter of a mile westward of Sokpuk kak (Sekihoku kaku), the northern point of Sōk to ; the western islet is 133 feet (40^m5) high, and the eastern islet 128 feet (39^m0) high. Pi ju (Hi shū), a shoal with depths of from 2 to 5 fathoms (3^m7 to 9^m1) over it, extends about 2½ miles south-south-westward from a position about a quarter of a mile south-westward of Chemae do.

A light is exhibited, at an elevation of 137 feet (41^m8), from a white circular concrete tower, 25 feet (7^m6) in height, situated on the western islet of Chemae do. A fog signal is sounded from the lighthouse and there is a radio station.

Tidal streams.—Near Ch'o do and Sōk to the tidal stream with the rising tide runs northward or north-eastward from about 2 hours before to 4 hours after the time of high water at Inch'ōn (Admiralty Tide Tables Standard Port) ; with the falling tide the tidal stream runs southward or south-westward from about 4 hours after to 2 hours before the next high water. The maximum rates off Ch'o do are 2½ knots with the north-going stream, and 3 knots with the south-going stream ; off Sōk to, 2½ knots and 3½ knots, respectively.

Charts 1257, 1256, 1262, 2347.

Chart 1656.

Coast.—Islets.—From Pip'a got the coast trends about $3\frac{1}{2}$ miles eastward to Wolp'o gi (Geppo ki). Between Wolp'o gi and Am gak (Gan kaku), situated about $6\frac{1}{2}$ miles north-eastward, there is a large bay filled by drying flats. Chongyang do (Seiyō tō), 234 feet (71^m3) high, situated within one mile east-north-eastward of Wolp'o gi, and Ung do (Yū tō), 385 feet (117^m3) high, close eastward, are the largest of several islets in the bay, and among the others are Chu do (Shu tō), U do (Gyu tō), Nūnggūm do (Ryokin tō), Samhyōngje do (Sankyodai tō), and Sō do (Ran tō), the positions of which can best be seen on the chart. Chu do (So tō), 59 feet (18^m0) high, lies about 3 miles west-south-westward of Am gak, nearly midway between Sōk to and the mainland. Su do (Kai tō), 147 feet (44^m8) high, lies close inshore about one mile west-south-westward of Am gak, with Haeam do (Kaigan tō), 41 feet (12^m5) high, off its eastern side.

Anchorage.—Sōkto myoji (Sekitō byōchi), the anchorage off the south-eastern side of Sōk to, is in depths of from $4\frac{1}{2}$ to 6 fathoms (8^m2 to 11^m0), sand and shells, with Nam gak bearing 270° , and the eastern extremity of Sōk to bearing 008° ; the bottom is rocky in places.

There is also anchorage, in depths of from 5 to 11 fathoms (9^m1 to 10^m9), sand and mud, about 4 cables northward of Chongyang do, (Lat. $38^\circ 36' N.$, Long. $125^\circ 03' E.$), with Tōk to bearing 260° and seen between Pip'a got and Ho do; ore from a mine situated about $4\frac{1}{2}$ miles eastward of this anchorage is shipped here.

Both these anchorages are reached by passing through the deep channel between Nam gak and Sō am; for directions *see* page 648.

TAEDONG GANG.—General remarks.—Taedong gang (Taidong kang) has its source in the middle of the northern part of Korea, and flows for about 237 miles in a general south-south-westerly direction into Yellow sea northward of Sōk to; nearly 30 miles eastward of Sōk to, Chaeryōng gang (Sainei kō) joins it from southward, and the direction changes abruptly to westward. The entrance to the river was formerly known under the name of Pingyang inlet. Taedong gang is more discoloured than any other river in Korea, and, with the ebb stream, the dirty water is carried far out to sea.

Chinnanp'o (Chinnampo), is situated on the northern side of the river and about 20 miles above Sōk to, and can be reached by large vessels at all states of the tide; thence to Ch'ōl to (Tetsu tō), at the junction of Chaeryōng gang and Taedong gang, the fairway is deep and free from dangers. Vessels of 5,000 tons can reach Kyomip'o (Kenjiho), situated on the eastern bank of Taedong gang about 17 miles above Chinnanp'o, and vessels of 3,000 tons can reach Posan anchorage (Chart 1257), situated on the western bank about 9 miles above Kyomip'o.

The buoys in Taedong gang and its approaches are removed during the season of drift ice.

Ice.—Taedong gang usually freezes over from late December till the middle of March, and it is then impassable above Chinnanp'o; owing to the drift ice Chinnanp'o is liable to be cut off from the sea for as much as three weeks during this season. From about 22nd January to 15th February the drift ice forms a dense pack off Chemaē do completely blocking the channel, although in recent years an in-

Chart 1656.

creasing number of vessels have forced their way through. Drift ice appears at Chinnanp'o not more than 10 days after the upper reaches of the river and its tributaries are frozen over; mist or fog (arctic smoke) rising from the whole surface of the river is an immediate warning of its approach.

With drift ice the worst part of the channel is that in the mouth, between Chemaë do and P'i do (Hi tō), situated nearly 10 miles eastward, and the conditions then determine whether entry into the river is possible or not; once past P'i do (*Lat. 38° 41' N., Long. 125° 11' E.*) the vessel has overcome the greatest part of her difficulties. Less drift ice may be expected during neap tides than during spring tides, as the latter bring it off the banks. If a vessel coming in with the rising tide gets shut in the ice in mid-channel she has nothing to fear, as the stream will carry her up to the fairway; the best time to pass through P'ido sudo (Hitō suidō) is one hour before high water. It is important to note the colour of the ice: green or white ice is easily broken and is not dangerous, but brown or grey ice has been formed on the banks, which dry, along the coast, and is full of mud and sand, not easily broken and dangerous.

Reports on the ice conditions are issued by the Chemaë-do radio station (*see Admiralty List of Radio Signals*), but the continually changing effects of the tidal streams and the wind must not be overlooked.

Tidal streams.—The tidal phenomena in the river vary considerably with the season, the wind and the rainfall, but present certain regular features. In mid-stream both the flood and the ebb streams follow the course of the river; except in the portion of the channel north-westward of Ch'ōl to, the maximum rate at spring tides is between 4 and 4½ knots for the ebb stream, and between 2½ and 3½ knots for the flood stream. The flood stream runs for a shorter period than the ebb stream. The interval from low water to the turn of the stream is longer than that from high water to the turn; in general the stream turns to out-going about 1½ hours before, and to in-going about 5½ hours after, the time of high water at Inch'ōn (*Admiralty Tide Tables Standard Port*). There is only a short period of slack water. The streams are stronger in the lower reaches than in the upper reaches. It has been reported that the main out-going stream is on the southern side of the channel, while the main in-going stream runs fairly down the middle of the channel.

Chemaë do to P'ido sudo.—**Islets and dangers.**—**Beacons.**—The main channel of the river eastward of Chemaë do (page 640) is bounded southward by the bank, with depths of less than 3 fathoms (5^m5) over it, which extends eastward from Sōk to to the mainland, and northward by some banks and shoals which extend in a crescent shape from a position about three-quarters of a mile north-eastward of Chemaë do as far as P'i do, which is situated nearly 10 miles eastward. Sangch'igwa do (Josuira tō), 81 feet (24^m7) high, is situated about 6½ miles east-north-eastward of Chemaë do, and about half a mile north-westward of the eastern end of the western and largest of the banks on the northern side of the channel, which dries in places throughout its length. Hach'igwa do (Kasuira tō), 99 feet (30^m2) high, lies about three-quarters of a mile north-westward of Sangch'igwa do. Shoals, which dry in places, extend about 5 miles west-

Charts 1257, 1256, 1262, 2347.

Chart 1656

ward and then another 4 miles south-westward from Hach'igwa do, and form the southern side of the entrance to another channel; this channel subsequently leads northward of Sangch'igwa do and P'i do, and, though wider than the main channel, it has several shoals 5 in it, and is only used by vessels of light draught.

Ch'an do (San tō), on the southern side of the channel, is situated about 2 miles southward of Sangch'igwa do and about half a mile north-westward of Am gak (page 641); it is 110 feet (33^m5) high and surrounded by a reef, and a detached rock, which dries 7 feet (2^m1), 10 lies about 1½ cables northward of it. A drying bank extends about 1½ miles west-south-westward from Ch'an do. The bay between Am gak and Koisu gak (kaku), situated about 2½ miles eastward, is almost entirely occupied by a mud flat which dries.

Chiri do (tō), situated about 1½ miles north-eastward of Ch'an do, 15 is a rock 31 feet (9^m4) high, and is a good mark; a shoal, with some rocks which dry on it, extends about 4 cables southward of Chiri do. Two reefs, with depths of 2½ and 2 fathoms (5^m0 and 3^m7) over them, lie about a quarter of a mile north-westward and half a mile northward, respectively, of Chiri do. A 4-fathom (7^m3) patch lies about 20 three-quarters of a mile north-eastward of Ch'an do and nearly in mid-channel. The depths in this locality are very irregular, and caution is necessary.

Chart 1656, plan of Hito suido.

P'i do (Hi tō) (Lat. 38° 41' N., Long. 125° 11' E.), situated about 2½ 25 miles eastward of Ch'an do, is 188 feet (57^m3) high, and the middle and largest of three islets situated on the northern side of the main channel; Ok to (Gyoku tō), 120 feet (36^m6) high, is the eastern islet, and a rock, 20 feet (6^m1) high, lies about one cable southward of it; Hojang do (Kochō tō), 129 feet (39^m3) high, the western islet, is 30 connected to P'i do by a sandbank which dries. There is foul ground between Chiri do and P'i do, with no clear passage across it.

P'i do sudo (Hitō suidō), the channel between P'i do and Koisu gak, a point on the mainland southward of P'i do, is only about a quarter of a mile wide between the shoals extending from either side, but the 35 fairway is deep. Two leading beacons, erected on the summit of a hill situated about 3 miles east-south-eastward of Koisu gak, in line bearing 109°, lead through P'ido sudo. The front beacon, 226 feet (68^m9) high, is a white wooden pillar surmounted by a triangle, 30 feet (9^m1) in height; the rear beacon is situated about a quarter of a cable 40 east-south-eastward of the front beacon.

Chart 1656.

Lights.—A light is exhibited, at an elevation of 131 feet (39^m9), from a white circular concrete tower, 12 feet (3^m7) in height, situated on Ch'an do. 45

A light is exhibited, at an elevation of 65 feet (19^m8), from a white octagonal concrete structure, 26 feet (7^m9) in height, situated on Chiri do.

Chart 1656, plan of Hito suido.

A light is exhibited, at an elevation of 207 feet (63^m1), from a white 50 circular concrete tower, 12 feet (3^m7) in height, situated on the summit of P'i do.

Tidal streams.—In the middle of P'ido sudo the east-going stream changes to the west-going stream about 4 hours after the time of

Charts 1257, 1256, 1262, 2347.

Chart 1656, plan of Hito suido.

high water at Inch'on (Admiralty Tide Tables Standard Port) and the west-going stream changes to the east-going stream about 2 hours before the time of high water, and runs for about 7 hours ; the maximum rate of the east-going stream is $3\frac{1}{2}$ knots, and that of the west-going stream is $4\frac{1}{2}$ knots.

Chart 1656.

P'ido sudo to Chinnanp'o.—Buoys.—The channel of the river between P'ido sudo and Chinnanp'o is practically free from dangers ; its width is reduced to about one mile in places where various headlands project on either side. The bays between these headlands are all occupied by mud flats which dry, and there are fishing stakes on the edges of these flats during the season ; there are several islets on these flats.

15 Kwangnyang man (Kōryō wan), entered on the northern side of the river about 4 miles north-eastward of P'i do, is a narrow bay which dries, except for a narrow channel only suitable for boats ; there are extensive salt works on the eastern side of the bay. The bay is approached through a channel between drying mudbanks fronting the coast, which is entered about 2 miles north-eastward of P'i do (*Lat. 38° 41' N., Long. 125° 11' E.*), and is marked by two red buoys and two black buoys. Kyōlsōk to (Kesseki tō), 28 feet (8^m5) high, Soso do (Shōsho tō), 42 feet (12^m8) high, and Taeso do (Taisho tō), 63 feet (19^m2) high, lie on the mudbank on the western side of the entrance channel, and Ch'o do (Sō tō), 62 feet (18^m9) high, and Nam do (Ran tō), 44 feet (13^m4) high, lie closer inshore north-westward of the entrance to the bay. Several shoals, with depths of from $1\frac{1}{2}$ to 3 fathoms (3^m2 to 5^m5) over them, obstruct the northern channel off the entrance of the channel leading to Kwangnyang man.

30 Ippong gak (Ritsubō kaku) lies on the southern shore about $4\frac{1}{2}$ miles eastward of P'i do. Between Ippong gak and a point situated about $3\frac{1}{2}$ miles east-north-eastward there is an indentation filled by a drying flat, in the entrance to which are Hyōngje do (Kyodai tō), 55 feet (16^m8) high, Puk to (Hoku tō), 58 feet (17^m7) high, and Mi do (Bei tō), 66 feet (20^m1) high.

Ap to (Ō tō), 95 feet (29^m0) high, lies near the edge of the mudbank on the northern side of the river and about $1\frac{1}{2}$ miles north-north-westward of Ippong gak, and Ilsu gak (Jū kaku) is a point on the northern shore about 2 miles further eastward.

40 Chō do (Cho tō), 175 feet (53^m3) high, a fairly large island on the mudbank, named Apsōk (O sha), extending from the southern side of the river, lies with Chōdo gak (Chotō kaku), its cliffy north-western extremity, about $3\frac{1}{2}$ miles eastward of Ilsu gak. A rock, with a depth of 6 feet (1^m8) over it, lies about a quarter of a mile westward of Chōdo gak, and about a quarter of a mile further westward is a rock with a depth of $4\frac{1}{2}$ fathoms (8^m2) over it.

Between Ilsu gak and Manyanggi gi (Manryoki ki), situated about $4\frac{1}{2}$ miles east-north-eastward, the northern shore is indented by several bays which are filled by drying flats, on which are numerous islets and rocks, including Ilch'ul to (Nisshutsu tō), 26 feet (7^m9) high, Ryul to (Ritsu tō), 30 feet (9^m1) high, Chin do (Shin tō), 101 feet (30^m8) high, Wau do (Gagyū tō), 156 feet (47^m5) high, and Sayōmjim do (Shienshin tō), 4 feet (14^m6) high ; the positions of all these can best be seen from the chart.

Charts 1257, 1256, 1262, 2347.

Chart 1656.

A $4\frac{1}{2}$ -fathom (8^m7) patch lies about half a mile south-eastward of Wau do ; there is a deep depression in the bed of the river between this patch and the rock, with a depth of $4\frac{1}{2}$ fathoms (8^m2) over it, lying about half a mile westward of Chōdo gak. 5

Chart 1656, plan of Chinnampo kō.

Sayōmjīn do (*Lat. $38^{\circ} 43' N.$, Long. $125^{\circ} 21' E.$*) has a single tree on its southern extremity, which is a good mark. Reclamation work was in progress, in 1937, in the bay westward of Manyanggi gi. 10

Chart 1656.

Lights.—Orip'o (Goriho) light is exhibited, at an elevation of 113 feet (34^m4), from a white square concrete tower, 20 feet (6^m1) in height, situated on a point on the southern shore about $2\frac{1}{2}$ miles south-eastward of P'i do. 10

Mach'ijin (Bachishin) light is exhibited, at an elevation of 157 feet (47^m8), from a white square concrete tower, 22 feet (6^m7) in height, on the point on the northern shore close eastward of Ilsu gak. 15

Chart 1656, plan of Chinnampo kō.

Chinnanp'o hang.—**Harbour limits.**—**Beacons.**—**Basin.**—**Piers.**—Amongst the harbours in Korea, Chinnanp'o hang (Chinnampo kō) has developed to such an extent in latter years that it ranks next to Pusan (Fusan) and Inch'on. It is opposite the town of Chinnanp'o, which had a population of 68,676 in 1940, and is the port for the industrial and mining region of P'yongyang (Pingyang) (chart 1257), the second largest city in Korea. The river here is nearly one mile broad, with depths of from 7 to 15 fathoms (12^m8 to 27^m4), generally sand and mud, and there is sufficient space to accommodate several large vessels at the same time. The anchorage is well sheltered on all sides, and its only disadvantage is that it is liable to be closed by drift ice for a period up to three weeks during January and February ; the ice arrives at Chinnanp'o not more than ten days after the upper reaches of the river are frozen over and water vapour rising from the whole surface of the river is a warning of its immediate approach. The western limit of the harbour is a line drawn 000° from the summit of Chō do to a beacon on the northern side of the river ; the eastern limit is a line drawn 349° from a beacon on Mangdalli gi (Botatsuri saki), situated about $3\frac{1}{4}$ miles east-north-eastward of the summit of Chō do (*Lat. $38^{\circ} 42' N.$, Long. $125^{\circ} 23' E.$*), to a beacon on the north-eastern extremity of Hwa do (Ka tō), on the northern shore. In 1936 it was reported that these beacons did not exist. 40

Manyanggi gi is situated just within the western limit of the harbour ; there is a pier and a flagstaff on the point, with a quarantine station close northward of it.

Namp'o gi (ki) is situated about half a mile eastward of Manyanggi gi, and there is a tide observation station, painted white, on its extremity. There is a pier close westward of this point, and another about 2 cables eastward of it. A conspicuous white building is situated nearly one cable north-westward of Namp'o gi. Yondae (Yendai) san is a round-topped hill, 313 feet (95^m4) high, about 3 cables northward of Namp'o gi. 45

Two radio masts, situated on a hill nearly half a mile north-eastward of Namp'o gi, are prominent. There is a tall chimney on Hwa do, and also two lower chimneys.

Mangdalli gi is the most prominent headland on the southern shore

Charts 1257, 1256, 1262, 2347.

Chart 1656, plan of Chinnampo kō.

of the river, and is easily identified; it has a somewhat flat summit, 95 feet (29^m0) high.

A basin has been constructed on the western side of Pibal to
 5 (Hihatsu tō), an island joined to the mainland by reclamation works, situated about one mile east-north-eastward of Namp'o gi. The greater part of the basin and alongside the quays was reported, in 1943, to have been dredged to a depth of 20 feet (6^m1). It was reported, in September 1949, that the basin had silted and was
 10 almost completely dry over most of its area, but a later report the same year stated that dredging was in progress, and it would be reasonable to assume a minimum depth of 18 feet (5^m5). Two vessels of 3,000 tons can lie alongside the quay on the eastern side of the basin, and two alongside the southern part of the quay on the
 15 western side; in addition, two 6,000-ton vessels can be loaded at the coal wharf on the western side; the northern part is used for small craft and lighters. The wharves are connected to the railway system. The Custom house is at the head of the basin.

The banks of Hup'o ch'ōn, a creek on the eastern side of Pibal to,
 20 have been faced with sloping stone-faced wharves for the use of lighters; there is a depth of 4 feet (1^m2) in this creek. There is a pier, for the use of small craft, close eastward of the entrance to Hup'o ch'ōn.

Coal stores, connected with the railway, are situated eastward of
 25 Hup'o ch'ōn; there are several coaling piers here.

The landing pier is close westward of the entrance to the basin, and there is also a pier at the quarantine station, situated about 4 cables north-eastward of Namp'o gi.

Lights.—Buoys.—A light is exhibited, at an elevation of 67 feet
 30 (20^m4), from a white hexagonal concrete structure, with a turret and cylindrical tank, 36 feet (11^m0) in height, situated on the southern extremity of Pibal to.

A light is exhibited from the flagstaff on Manyanggi gi (*Lat.* 38° 43' N., *Long.* 125° 23' E.).

35 Two conical buoys, each painted red and black in horizontal bands, mark the edge of the reef which extends from the northern shore about 2 cables westward of the entrance to the basin.

Anchorage.—There is anchorage outside the basin, in depths of from 7 to 15 fathoms (12^m8 to 27^m4), mud or sand, not less than 2
 40 cables offshore; the mud or sand has been deposited over hard rock bottom and the holding ground can scarcely be described as good. The anchorage near Pibal-to light-structure is not good; the tidal streams are very strong here, there is an eddy along the wall on the western side of the island, and the position is dangerous during the
 45 season of drift ice. A vessel has, however, anchored with Pibal-to light-structure bearing 300°, distant about 2 cables, and the tall chimney on Hwa do in line with the south-eastern extremity of Handu san (Kantō zan), bearing about 044°, mud bottom and good holding ground; a little westward of this position the holding ground
 50 is bad. It is better to anchor in mid-stream, in depths of less than 10 fathoms (18^m3), where the tidal streams are not so strong and the holding ground is better.

Most vessels proceed alongside the wharves in the basin to work cargo, but if there is not room for them they must not anchor off the

Charts 1257, 1256, 1262, 2347.

Chart 1656, plan of Chinnampo kō.

entrance and obstruct the fairway. During the ebb stream there is a strong eddy along the eastern wall of the basin, and vessels are liable to be swung round by it; it is difficult to proceed alongside or leave this wall between about one or 2 hours after high water and low water. 5

Winds and weather.—North-westerly winds prevail from December to May, and westerly winds the remainder of the year. Heavy fog is prevalent from June to August.

Tidal streams.—In the middle of the river south-westward of Pibal to (*Lat. 38° 43' N., Long. 125° 25' E.*) the east-going stream 10 runs from about 1½ to 2 hours after low water till just before the next high water; the west-going stream runs from just before high water till about 1½ to 2 hours after the next low water, that is from 7 to 7½ hours. The maximum rate of the east-going stream is 3½ knots, and that of the west-going stream 4½ knots. Near the banks of the 15 river the change of direction from east-going to west-going occurs from one to 2 hours earlier than in mid-stream.

Off the basin the main part of the east-going stream runs approximately up the middle of the river, but that of the west-going stream runs well over towards the basin; the maximum rate of the former is 20 about 2½ knots, and that of the latter nearly 4 knots. Owing to the irregularity of the contour of the banks westward of the basin, the tidal streams near the basin are very complex.

Pilotage.—Pilotage is optional. If an application for a pilot is made beforehand, the pilot will board the vessel near the buoy 25 northward of Ha ju, or, if the weather is bad, off Chemaë do. The pilot boat is a 50-ton naval patrol boat. During the season of drift ice it may be very difficult to embark or disembark a pilot.

Chart 1656.

Directions.—*From westward.*—Ch'o do, Sōk to, and Tōk to (the 30 islet lying about 4 miles northward of Chemaë do), are excellent marks for fixing the position of a vessel. Tōk to (the islet lying close off the northern extremity of Ch'o do) should be steered for bearing about 090°, and when the lighthouse on Chemaë do bears 056°, keep it on that bearing; this leads between Chung ju and Ha ju, and 35 northward of the buoy marking the northern end of the latter. At night keep in the *white* sector of Chemaë-do light, visible between the bearings 053° and 060°. When about 2 miles from Chemaë do course should be altered to pass about 2 cables northward of that islet, and thence southward of the bank which extends about 6 miles 40 west-south-westward from Sangch'igwa do. Chiri do is a useful mark to steer for, and it should be kept bearing about 080° from a position about one mile eastward of Chemaë do. At night, keep in the *white* sector of Chemaë-do light, visible between the bearings 255° and 266°. When nearing Ch'an do bring the leading beacons situated on 45 a hill near Orip'o lighthouse in line, bearing 109°, which will lead through P'ido sudo; care must be taken, however, to avoid the 4-fathom (7^m3) patch lying about three-quarters of a mile north-eastward of Ch'an do. The remainder of the route to Chinnanp'o gang presents no difficulty. 50

Chart 1257.

From southward.—After passing westward of Paengnyōng do (page 634 and chart 1258) course should be shaped to pass not less than one mile westward of Changsan got, as the tidal streams are strong here;

Charts 1256, 1262, 2347.

Chart 1257.

when Tae do bears 066° steer for it on that bearing, and when Taegam am, the rock close off Changsan got, bears 222°, keep it astern on that bearing. Thence steer for the eastern extremity of Ch'ŏ do, bearing 017°, so as to pass about one mile westward of Oryuji gi.

Chart 1656.

When Ponghwa san (Hōkwa zan), a peak situated nearly 3½ miles east-south-eastward of Pip'a got, is in line with Yōngjōng gi (*Lat. 38° 32' N., Long. 124° 59' E.*), bearing about 039°, keep this mark on until Sokpuk kak comes in line with Hug am, bearing 017°, when steer for these latter marks in line, which leads between Pansōng ch'ŏ and Nae ju. When Yōngjōng gi bears 104° course should be altered to 355°, so as to pass between the northern end of Nae ju and the shoal lying about one mile south-westward of Pip'a got.

Vessels bound for Sōkto myoji or the anchorage northward of Chongyang do (page 641) should alter course eastward when Hug am bears about 090°, and then proceed through the channel between Sō am and Nam gak.

Vessels entering Taedong gang should continue to steer 355° until Chema-e-do lighthouse bears 056°, when proceed as directed for vessels from westward.

Chart 1656, plan of Chinnampo hō.

Harbour facilities.—Supplies.—Communications.—A number of travelling cranes are available, including one capable of lifting 5 tons, and two of lifting 1½ tons.

There are numerous lighters; tugs are available. During the drift ice season cargo is only worked in the basin, although in exceptional circumstances lighters might be used out in the stream.

There is a small graving dock and several small patent slips. Small repairs can be carried out.

There is a hospital.

Water is laid on to the wharves in the basin, and there is a water-boat for supplying vessels in the stream. A fairly large stock of coal is usually maintained.

Chinnanp'o is connected to the railway system of Korea, and to the telegraph and telephone system. Coastal steamer service is maintained between Chinnanp'o and North China.

Storm signals.—Storm signals are displayed from the light-station on the southern extremity of Pibal to; see page 28.

Trade.—In normal times, the principal exports are rice, soya beans, coal, iron, and paper; imports are iron, coal, hardware, fertilisers, oils, chemicals, and textiles.

Chart 1656.

Chinnanp'o to Ch'ŏl to.—Light-buoy.—Anchorage.—The bay on the southern side of the river, between Mangdalli gi and Osōk (Goseki) ki, a low, prominent headland, situated about 6 miles east-south-eastward, is filled by a mudbank which dries, known as Ansōk (Gan sha). Ch'ōngt'oe do (Seitai tō) (*Lat. 38° 42' N., Long. 125° 32' E.*), 32 feet (9m8) high, lies on this mudbank about 1½ miles west-north-westward of Osōk ki and about 4 cables within the edge of the mudbank; there are depths of 3 fathoms (5m5) and less for a further 3 cables outside this edge. The northern bank of the river should, therefore, be held off Ansōk.

The bay on the northern side of the river between Hwa do and

Charts 1256, 1262, 2347.

Chart 1656.

Uisan gi (Gyujisan ki), situated about 3 miles east-south-eastward, is filled by a drying mudflat, and in it lies Kōmdōk to (Kentoku tō), 211 feet (64^m3) high. Ch'ōndu gi (Tenchi ki) lies about 2 miles eastward of Uisan gi (*Lat.* 38° 43' N., *Long.* 125° 30' E.).

Aeam gap (Gaigan misaki) is situated about 2½ miles south-eastward of Osōk ki and is the south-western point of a peninsula which extends southward from the northern shore of the river; this peninsula alters the course of Taedong gang to a northerly direction. Ch'ōl to (Tetsu tō) is situated south-eastward of the extremity of this peninsula and forms the opposite bank of the river. Chaeryōng gang (Sainci kō) enters Taedong gang along the southern side of Ch'ōl to. Rocks, which dry, extend about one cable off Hōksong gi (Kuromatsu ki), the western extremity of Ch'ōl to. The channel along the north-western side of Ch'ōl to is only about 3 cables wide and the tidal streams through it are very strong.

A light-buoy, painted red, and exhibiting a *red occulting light every ten seconds*, is moored southward of the rocks off Hōksong gi and in the entrance to Chaeryōng gang.

There is anchorage, in depths of from 8 to 9 fathoms (14^m6 to 16^m5), close to the south-western bank of the river and westward of Ch'ōl to; the holding ground is good, but the tidal streams are strong and rotatory, and the anchorage is not recommended.

Cable.—Prohibited anchorage.—A submarine telegraph cable crosses the river about three-quarters of a mile south-eastward of Osōk ki; anchorage is prohibited within about a quarter of a cable on either side of this cable. *See* page 37.

Tidal streams.—In the middle of the fairway off Ch'ōl to the tidal streams change from north-eastward to south-westward about 4½ hours after the time of high water at Inch'ōn (Admiralty Tide Tables Standard Port), and from south-westward to north-eastward about half an hour to one hour before high water; the stream runs south-westward for from 7 to 7½ hours, with a maximum rate of 7½ knots. The maximum rate of the stream running north-eastward is 5 knots.

Chaeryōng gang.—Anchorage.—Chaeryōng gang is shallow, and there is a least depth of 1½ fathoms (2^m7) in the fairway off the south-western side of Ch'ōl to; just above this island the depths increase slightly, and there is anchorage for small vessels in depths of from 3½ to 4 fathoms (6^m4 to 7^m3), mud. Thence the depths decrease again, and Chaeryōng, situated about 13 miles further up, can only be reached by boats.

Ch'ōl to to Kyomip'o.—Light-buoy.—Anchorage.—Taedong gang from the northern end of Ch'ōl to to Kyomip'o, a distance of about 5 miles, has depths of from 6 to 13 fathoms (11^m0 to 23^m8) in the fairway, but in two places this is only about one cable wide. Kwang ju (Hiro su), a shoal with depths of less than 3 fathoms (5^m5) over it, extends from the eastern bank of the river and about 1½ miles above the northern end of Ch'ōl to; the channel here runs close along the western bank. A spherical light-buoy, painted red and exhibiting a *white flashing light*, is moored off the western side of Kwang ju.

P'yōng gi (Hira ki) is a low, prominent point on the western bank of the river and nearly 4 miles northward of the north-western point of Ch'ōl to. A shoal, with a depth of 3½ fathoms (5^m9) over its outer end, extends about 3½ cables from the shore close southward of

Chart 1656.

P'yŏng gi ; there is a deep passage, about $1\frac{1}{2}$ cables wide, along the eastern bank here.

- Kyomip'o (*Lat. $38^{\circ} 45' N.$, Long. $125^{\circ} 38' E.$*) is an important town, with a population of 25,000, in 1939, situated on the eastern bank of the river, and is the site of the largest iron and steel works in Korea. A hillock, 138 feet (42^m1) high, is situated on the bank of the river and about 3 cables southward of the town. Kyomip'o is connected to the general railway system of Korea. Water may be obtained.

10 Cranes of various types serve the water front.

- The anchorage off Kyomip'o can accommodate ocean-going vessels of moderate size in depths of $5\frac{1}{2}$ fathoms (9^m6) or more. South-westward of the town, the rocky bottom affords poor holding ground. Somewhat further downstream southward of the town, better holding
- 15 ground of deep silt over rock is reported. There is mud bottom, with depths of $6\frac{1}{2}$ fathoms (11^m9) over it, in a position southward of the 138-foot (42^m1) hillock. All cargo is worked by lighters.

- A shoal, with depths of less than 3 fathoms (5^m5) over it, extends about one mile south-eastward from the north-eastern side of the
- 20 river nearly one mile above Kyomip'o ; Chang ju (Naga su) is situated on the south-western part of this shoal, and has depths of from 2 to 6 feet (0^m6 to 1^m8) over it.

- Tidal streams.**—In the narrow channel westward of Kwang ju the north-going tidal stream turns to the south-going stream about $4\frac{1}{2}$
- 25 hours after the time of high water at Inch'ŏn (Admiralty Tide Tables Standard Port), after running for from 5 to $5\frac{1}{2}$ hours ; the south-going stream turns to the north-going stream about one hour before the time of high water at Inch'ŏn, after running for about 7 hours. The maximum rate of the north-going stream is $3\frac{1}{2}$ knots, and that
- 30 of the south-going stream $4\frac{1}{2}$ knots.

- In the middle of the river off Kyomip'o the stream running north-westward turns south-eastward about $5\frac{1}{2}$ hours after the time of high water at Inch'ŏn ; the stream running south-eastward turns north-westward about half an hour before the time of high water,
- 35 after running for about $6\frac{1}{2}$ hours. The maximum rate of the stream running north-westward is $3\frac{1}{2}$ knots and that of the stream running south-eastward 4 knots. The stream is very weak for about half an hour during the turn from north-westward to south-eastward. The tidal streams close in to the banks of the river usually turn
- 40 about one hour earlier than in mid-stream.

Charts 1656, 1257.

- The river above Kyomip'o.—Anchorage.**—Above Kyomip'o (*Lat. $38^{\circ} 45' N.$, Long. $125^{\circ} 38' E.$*) the river is much obstructed by shoals, but it is navigable as far as Posan anchorage, situated about 9 miles
- 45 above Kyomip'o. Posan anchorage lies off the village of Chumadong, on the western bank of the river, where there are some small coaling piers. The depths in this anchorage are from 26 to 29 feet (7^m9 to 8^m8), with good holding ground. There is also anchorage off the town of Yop'o (Yohori), situated on the eastern side of the river
- 50 about 5 miles above Kyomip'o. Both these anchorages are restricted, and local knowledge is essential. Above Posan anchorage, the river gradually shoals and narrows, and is not navigable by power vessels. P'yongyang (Pingyang), the second largest town in Korea, lies about 20 miles above Kyomip'o.

Charts 1256, 1262, 2347.

*Chart 1257.***COAST.—Taedong gang to Ch'ōlsan pando.—Islets and dangers.—**

Buoys.—The coast between the northern side of the entrance to Taedong gang and Ch'ōlsan pando (Chorusan peninsula), which lies with its southern extremity about 56 miles north-north-westward of Chemae do (page 640), is indented by an extensive bay, in which are numerous shoals and banks which dry; the shores of this bay are fringed by flats, which dry, extending as much as 7 miles offshore in places. There are numerous fish traps from 3 to 5 miles offshore on the eastern side of the above bay. 5

Chart 1656.

Hwa do (Kwa tō) (*Lat. 38° 49' N., Long. 125° 08' E.*), 206 feet (62^m8) high, lies on the coastal bank which extends from the southern part of this coast and about 11 miles north-eastward of Chemae do; it is partly cultivated, devoid of trees, and inhabited. It is difficult to identify from a distance, as it is of the same colour as the coast behind. 15

U (Gyu) san, 1,653 feet (503^m8) high, is situated about 9 miles east-south-eastward of Hwa do.

Chart 1257.

The coast between Hwa do (Ha to) and Nam p'o, situated about 17 miles northward, is mostly low and flat, with numerous salt pans, and can only be approached by boats at high water. A few miles inland are ranges of hills and mountains, the highest being Osōk (Usoku) san, 1,866 feet (568^m8) high, with the famous castle of Hwangyong Sōng on it, situated about 9 miles north-eastward of Hwa do. Puhōng bong (Kinto san) 893 feet (272^m3) high, is situated about 2 miles north-westward of U san. Pae bong, 1,226 feet (373^m7) high, and Ssanga san, 1,010 feet (307^m8) high, are prominent peaks, situated about 1½ and 2½ miles, respectively, northward of Osōk san. A fairly level ridge runs for about 9 miles northward from Ssanga san, the highest peak being Ungam san, 1,360 feet (414^m5) high, situated about 3½ miles northward of Ssanga san. Kwangdong (Kagutogu) san, 1,300 feet (396^m2) high, lies between Ssanga san and Ungam san, and Ulyong (Onnogu) san, 1,036 feet (315^m8) high, lies about 3 miles north-north-eastward of Ungam san. All these peaks appear like a chain of high islands when seen from a distance of about 10 miles offshore. 25

Namjoap (Nanjogafu) to, situated about 3½ miles northward of Hwa do, is a prominent islet, 181 feet (55^m2) high with a group of trees on its summit; there are a few houses on the cliff on its north-western side. A group of rocks, the highest of which dries 17 feet (5^m2), lies about 2½ miles west-south-westward of Namjoap to. Ponghwang (Hoam) p'o, a basin which dries except for a narrow channel, is entered about 7 miles north-north-eastward of Namjoap to; the northern side of this basin is formed by a long, narrow sand-spit, and on the inner end of this spit is a large rock, 59 feet (18^m0) high, with a prominent dark wood close southward of it. Iap to (Iaku somu) consists of two islets of similar height, of which the eastern is 89 feet (27^m1) high and reddish brown in colour, situated about 3½ miles northward of the northern entrance point to Ponghwang p'o. Iap to is the highest of a large group of rocks, including a few above water but the majority of which dry. Pukcho sō (Puchogapu to) lies about 6 miles north-eastward of the northern 30

Charts 1256, 1262, 2347.

Chart 1257.

entrance point of Ponghwang p'o and off the entrance to Nam p'o ; the cliff on its western side is 164 feet (50^m0) high, and the eastern end is a sand spit ; there are some houses on the northern side of this islet, and four groups of pine trees on the southern side. Nam p'o dries except for a narrow channel, available for boats at high water ; there are salt pans along the southern side of this creek.

A red conical buoy, No. 2, is moored about 6½ miles westward of Pukcho sŏ.

- 10 The coast between Pukcho sŏ (*Lat. 39° 05' N., Long. 125° 16' E.*) and the southern entrance point of Chinbang (Chimbagu) p'o, situated about 13 miles north-eastward, is clifty, and consists of several hilly peninsulas with bays or creeks between, but they all dry. Hajŏn do (Hasuru somu), situated about 2½ miles northward of Pukcho sŏ, is a small peninsula, 70 feet (21^m3) high, covered with pine trees ; Chŏn do, a flat-topped islet 36 feet (11^m0) high, lies close offshore and about half a mile northward of Hajŏn do. Kuksu bong, 1,095 feet (333^m8) high and the highest hill along this part of the coast, is situated about 5 miles eastward of Hajŏn do. Sail (Cheip) p'o is a small bay entered about 2 miles northward of Hajŏn do. T'an p'o (Su ho), the next bay northward, has three islets in it and some salt pans at its head. Hŭg am (Compau), a group of rocks 23 feet (7^m0) high, lies about half a mile offshore between Sail p'o and T'an p'o. Kama p'o, lying nearly 2 miles north-eastward of T'an p'o, penetrates the land for about 4½ miles in a south-easterly direction, but the upper half is all salt pans ; two islets, covered with pine trees, lie close off the southern entrance point, and there is a house and a temple on the northern one. Yŏndae bong, a hill 295 feet (89^m9) high, situated on the northern side of the entrance to Kama p'o, is prominent.

A red conical buoy, No. 4, is moored about 4 miles west-north-westward of the entrance to Kama p'o.

- Hanch'on (Hanchom) p'o, situated about 2½ miles north-eastward of the northern entrance point of Kama p'o, is entered by a channel available for boats within about 3 hours of high water. Chinbang (Chimbagu) p'o, lying about 2½ miles north-eastward of the northern entrance point of Hanch'on p'o, has a hill 335 feet (102^m1) high, surmounted by a beacon tower, on its southern entrance point ; the channel runs along the southern shore, and it can be used by boats within 3 hours of high water, but with the rising tide the stream rushes into the inlet with such force and volume that small craft may be capsized.

- The coast between Chinbang p'o and the mouth of Ch'ŏngch'on gang (Chonchon kagu), situated about 19 miles north-north-eastward, is flat and low, consisting mostly of salt pans and marshes ; in many places the coastal bank is only covered at high water spring tides.

- Ch'ŏngch'on gang and Taenyŏng gang (Tainin kagu) flow along the southern and northern sides, respectively, of Pakch'ŏn pando (Pakuchon), and have a common estuary, of which Sao (Sau) p'o, situated about 12 miles northward of Chinbang p'o, is the southern entrance point. Between Chinbang p'o (*Lat. 39° 17' N., Long. 125° 25' E.*) and Sao p'o are situated Sagun (Sagom) p'o, Yŏsan (Sukushim) p'o, Tongo (Toguu) p'o, and Samch'ŏn (Sansem) p'o ; their positions can best be seen from the chart. Anju, situated

Charts 1256, 1262, 2347.

Chart 1257.

about 8 miles up Ch'ŏngch'on gang, is an important market town. Pakch'on, the principal village on Taenyŏng gang, is situated about 12 miles above its mouth. Anju and Pakch'on can only be reached by small craft not exceeding 6 feet (1^m8) in draught, by availing themselves of the tide. 5

The coast between the northern entrance point of the estuary of Taenyŏng gang and Ch'ŏngch'on gang, situated about 5 miles north-westward of Sao p'o, and Ch'ŏlson pando, trends west-north-westward for about 30 miles, and is considerably indented; it is fronted by a 10 drying mud bank which extends at least 4 miles offshore, and on which there are many islets and rocks. Chasŏng (Chonchoku) san, 808 feet (246^m3) high, lies about 3 miles northward of the northern entrance point of the estuary of Taenyŏng gang and Ch'ŏngch'on gang. Ch'irak (Chiraku) san, 1,182 feet (360^m3) high, and Mogu 15 (Myōzu) san, 1,368 feet (417^m0) high, lie, respectively, about 7 miles east-north-eastward, and 9 miles north-eastward of Chasŏng san. Talch'on gang (Tarure Kagu), the largest indentation on this stretch of coast, is entered about 10 miles north-westward of Sao p'o; Pongo san, a rocky peak 538 feet (164^m0) high, with some pine trees 20 on its summit, is situated on its western entrance point.

Imhae (Imei) san, a peak 948 feet (288^m9) high, is situated about 8 miles north-westward of Chasŏng san and about 3 miles inland. Nūnghān (Nonhan) san, 1,366 feet (416^m4) high, is situated about 3 miles north-north-westward of Imhae san, and has the ruins of a 25 castle on it. Ho (Hagu) p'o, Pangch'uk (Baguchii) p'o, and Tongnoe (Togufe) p'o, are indentations lying, respectively, about 6, 8, and 11 miles west-north-westward of Talch'on gang; Mangnyong dan (Lat. 39° 38' N., Long. 124° 59' E.) is the point between Pangch'uk p'o and Tongnoe p'o. 30

Off-lying islets and shoals.—Channels.—Light-buoy.—The extensive bay between the entrance to Taedong gang and Ch'ŏlsan pando, and its approaches, are encumbered by a series of narrow shoals, all more or less parallel to the eastern shore of the bay. The outermost of these shoals are Pugi ju (Kitanohanare su) and Ch'u ju, which are 35 described below. Only the more important of these shoals are described, and for details of the others the chart should be consulted.

Chart 1656.

Pugi ju, with a least depth of 3½ fathoms (6^m9) over it, extends about 5 miles northward from a position about 12 miles north-north- 40 westward of Sŏ do (page 638).

Chart 1257.

Ch'u ju, with a least depth of 3½ fathoms (5^m9) over it, extends about 7 miles northward from a position about 8 miles westward of the northern end of Pugi ju. Piradesu ju (Pylades shoal), with a 45 depth of 3½ fathoms (6^m4) over it, lies about 6 miles northward of the northern end of Pugi ju.

A light-buoy, painted in red and black horizontal bands and exhibiting a *white flashing* light, is moored about 6½ miles north-eastward of Piradesu ju. 50

Sŏ ju is a narrow sandbank which extends about 16 miles north-north-eastward from a position about 11 miles north-westward of Chemaē do (page 640); it dries in two places near its northern end, and there are depths of from one foot (0^m3) to 5 fathoms (9^m1) over

Charts 1256, 1262, 2347.

Chart 1257.

the remainder. Tong ju (Higashino su), eastward and parallel to Sō ju, has been described on page 639. Sō sudo, the channel between Sō ju and Tong ju, and Tong sudo, the channel between the latter and the coastal bank, are from one to 3 miles wide, with depths of from 5 to 18 fathoms (9^m1 to 32^m9); they lead north-north-eastward until westward of the entrance to Hanch'on p'o, which is the northern limit of navigation for vessels of moderate draught. Further northward, to the estuary of Ch'ōngch'on gang and Taenyong gang, there are numerous banks which dry, with only narrow, shallow passages between them. Hamangō do (Hamaguu to), a rocky islet 28 feet (8^m5) high, lies about 16 miles westward of the southern entrance point of Hanch'on p'o; Sangmangō do (Sammaguu to), lying about 5 miles north-eastward of Hamangō do, is a rocky islet 47 feet (14^m3) high. These two islets lie on a bank which dries over the greater part, and small craft proceeding to Ch'ōngch'on gang proceed through the channel along the eastern side of this bank. Oesun do (Mechura somu), situated about 11 miles north-eastward of Sangmangō do, is a reddish brown islet, 98 feet (29^m9) high, with a small clump of trees on its flat summit; it has cliffy coasts, and lies on a sandbank which dries.

Kal to (*Lat.* $39^{\circ} 30' N.$, *Long.* $125^{\circ} 12' E.$) lies about 3 miles north-north-westward of Oesun do, and is an islet 199 feet (60^m7) high, with pine trees on its summit; its northern coast is precipitous, and there are some houses on its eastern coast. Ae do (Suku somu), lying on the coastal bank, about $1\frac{1}{2}$ miles northward of Kal to, has two reddish peaks with some low white hills between; the north-western peak is 184 feet (56^m1) high. There are numerous houses along the eastern coast of this island. There are numerous rocks above water and rocks which dry on the portion of the coastal bank which extends southward and westward from Ae do; the most prominent of these is Yunsori do, with a sharp summit 96 feet (29^m3) high, situated nearly $1\frac{1}{2}$ miles westward of Ae do and on the eastern side of the channel leading to Talch'on gang. Oejang do (Weijan to) and Naejang do lie on the mudbank, which dries, forming the western side of the channel leading to Talch'on gang; Oejang do lies with its southern extremity about $2\frac{1}{4}$ miles westward of Ae do, and has two hills, the western and higher being 422 feet (128^m6) high. Naejang do, situated close northward of Oejang do, has three peaks, the middle and highest of which is 355 feet (108^m2) high and has a dense wood of pine trees on its western shoulder.

Unmu do (Ummu somu), 134 feet (40^m8) high, lies about $7\frac{1}{2}$ miles northward of Sangmangō do and is cliffy on its south-eastern side; Kuni do, a conical islet 54 feet (16^m5) high, lies about 3 miles south-westward of Unmu do, and is almost connected to it by a sandbank. Kamsōng yōlto is a chain of about 20 islets extending about 9 miles northward from Unmu do. The approach channel to Talch'on gang runs through this chain, between Taegam do (*Lat.* $39^{\circ} 29' N.$, *Long.* $125^{\circ} 07' E.$), situated about $3\frac{1}{2}$ miles northward of Unmu do and 127 feet (38^m7) high, and Chung do, about one mile further northward and 103 feet (31^m4) high; a reef extends about half a mile southward from Chung do, thus narrowing the channel to half a mile. Taebōl (Oyon) to, 126 feet (38^m4) high, is the islet next northward to Chung do. Sogamson yōlto is another chain of islets running for about $4\frac{1}{2}$ miles towards the coast in a northerly direction from an islet, 28 feet

Charts 1256, 1262, 2347.

Chart 1257.

(8^m5) high, situated about 3½ miles north-westward of Chung do ; Myo do, the largest islet of this chain, lies about 6 miles north-north-westward of Chung do and is 124 feet (37^m8) high.

No do (Waku somu), 40 feet (12^m2) high, lies about 9 miles west-north-westward of Unmu do, and is connected to Sogamson yölto by drying flats. 5

Sinmi do.—Islets and dangers.—Sinmi do (Shimmi to) lies with its southern extremity about 10 miles south-eastward of the southern extremity of Ch'ölsan pando, and is the largest island in the bay 10 between the entrance to Taedong gang and Ch'ölsan pando. This island is surrounded by a drying mudbank, which nearly connects it to the mainland northward, and also to Uri do (Urichā), situated about 2½ miles south-westward and described below. This mudbank extends about 2 miles off the western side of the island except in the 15 vicinity of salient points, and on it lies numerous islets and rocks ; only the more important of these are described, and the positions of the remainder can best be seen from the chart

A range of hills runs throughout Sinmi do from north to south and there is very little level ground ; Unjong (Unjogu) san, the summit, 20 is 1,737 feet (529^m4) high and situated almost in the middle of the island, and a summit, 1,519 feet (463^m0) high, is situated about half a mile westward, both being sharp prominent peaks. The hills are mostly rocky, but, being covered with low trees and rough grass, they appear green when seen from a distance. On the southern 25 extremity of the island is a prominent conical hill, 436 feet (132^m9) high. In the middle of the western coast is a small peninsula, 505 feet (153^m9) high, connected to the main island by a low isthmus ; Hang got is its western extremity. There is a small village on the northern side of this isthmus, and landing can be effected here when 30 the bank which extends from this side of the island is covered. Chi do (*Lat. 39° 30' N., Long. 124° 52' E.*), an islet 180 feet (54^m9) high, lies close off the southern coast of Sinmi do, and about 1½ miles eastward of this islet is Samwöl to, a wooded islet 98 feet (29^m9) high, with a rock, 26 feet (7^m9) high, about a quarter of a mile south- 35 westward of it. Ch'uk to, an islet 336 feet (102^m4) high, lies nearly 1½ miles north-north-westward of the southern point of Sinmi do ; its summit is covered with grass and there is scrub elsewhere. Soch'uk to, 189 feet (57^m6) high, lies close north-eastward of Ch'uk to, and Mük to, 240 feet (73^m1) high, about one mile further in the 40 same direction. Karang do and Sogarang do, 77 and 76 feet (23^m5 and 23^m2) high, respectively, lie close together nearly 3 miles north-eastward of Hang got. Chari do, 159 feet (48^m5) high, and Honggan do, 295 feet (89^m9) high, lie, respectively, about one mile westward and half a mile northward of the northern end of Sinmi do ; Kalli do, 45 149 feet (45^m4) high, lies nearly midway between them.

Islets and dangers south-westward of Sinmi do.—Nap to (Napu somu), 205 feet (62^m5) high, the southernmost of these islets, lies about 14 miles south-south-westward of the southern extremity of Sinmi do, and is a rocky islet with patches of grass ; Sorap to lies 50 close eastward of Nap to and is a similar islet. A 3¼-fathoms (6^m9) patch lies nearly 2 miles south-westward of Nap to, and there is a 4½-fathom (8^m2) patch between ; a rock, 22 feet (6^m7) high, lies about 4 cables northward of the western extremity of Nap to. Mūgi do, 148

Charts 1256, 1262, 2347.

Chart 1257.

feet (45^m1) high, lies about one mile north-eastward of Nap to. These three islets are frequented by numerous sea birds, and at night or in foggy weather the cries of the gulls may indicate their positions.

- 5 Samch'a do (Chamuza), situated about 8 miles northward of Nap to, is covered with shrubs, and rises steeply in the centre to a conical peak 605 feet (184^m4) high. Chôngjok to consists of three islets lying close together, the southern of which is 83 feet (25^m3) high and lies about 6 cables southward of Samch'a do; the summits of the two
10 southern of these islets are densely wooded. Sot'ogi do (Patsugu to), 78 feet (23^m9) high, lying about 2 miles south-south-westward of Samch'a do, consists of two islets of about the same elevation; rocks above water and sunken rocks lie within a distance of half a mile south-eastward of these two islets. Chök to, nearly 1½ miles
15 east-north-eastward of Samch'a do, is a small islet 106 feet (32^m3) high, with cliffs of a reddish colour all round; its western side is thickly covered with low trees. Pu do, 142 feet (43^m3) high, situated about one mile northward of Samch'a do, consists of two hills joined together by a narrow neck of land; it lies on the southern part of a
20 long narrow shoal, which dries in parts and has depths of less than 3 fathoms (5^m5) over the remainder.

- Uri do (Urichā), 694 feet (211^m5) high, lies with its southern extremity about one mile east-north-eastward of Pu do and much resembles Samch'a do when seen from westward, although the latter
25 is more easily identified owing to its conical shape. Uri do has but few trees on it, being mostly grass with a little cultivated land; there are a couple of houses on its northern side. Myönbakki do (Murumbaiki), lying about 2½ miles south-eastward of Uri do, is a small islet, 117 feet (35^m7) high, covered with dark green trees.
30 Hambakki do, lying about 2½ miles north-eastward of Myönbakki do, is a round islet, 111 feet (33^m8) high, covered with trees and reeds.

- Chung ju is a sandbank which extends about 25 miles north-north-eastward from a position about 7 miles westward of Nap to, until it joins the coastal bank which extends from the main coast
35 northward of Sinmi do; there are depths of less than 5 fathoms (9^m1) on its southern extremity, but considerably less water over the greater part of the bank. Chung ju dries over a large area north-westward of Samch'a do (*Lat.* 39° 25' N., *Long.* 124° 43' E.), and in several places further northward.

- 40 **Islands, islets, and dangers southward of Ch'ölsan pando.—Light-buoy.—Anchorage.**—Taehwa do (Tefa tō), 871 feet (265^m5) high, is situated about 8 miles southward of the southern extremity of Ch'ölsan pando, and is a hilly island sloping down from its centre to a long, narrow point at its northern extremity, from which a rocky
45 ledge, which dries, extends about half a cable northward. A shoal, with depths of only a few feet over it, extends as much as three-quarters of a mile from the northern part of the eastern coast, and a rock awash lies about a quarter of a mile north-eastward of the eastern point of the island; a shoal, with depths of less than 3 fathoms (5^m5)
50 over it, extends as much as 4 cables from the north-western coast. There is a small village on the eastern side of the island, and this part is well wooded. Taehwa ju is a sandbank, with depths of from 1½ to 3½ fathoms (2^m7 to 6^m9) over it, which extends fully 3 miles south-westward from the southern side of Taehwa do.

Charts 1256, 1262, 2347.

Chart 1257.

A group of three islets lies off the south-eastern side of Taehwa do and separated from it by Taehwa sudo, a deep channel about 4 cables wide ; Taejŏngjok to, the north-western and largest islet, is 253 feet (77^m1) high and is covered with coarse grass, and the southern islet is 138 feet (42^m1) high, and named Sŏjŏngjok to.

A shoal, with depths of less than 3 fathoms (5^m5) over it, extends about one mile northward from these islets.

Sohwa do (*Lat. 39° 28' N., Long. 124° 37' E.*) is an inhabited island lying nearly half a mile northward of Taehwa do, and its summit, 397 feet (121^m0) high, is in the centre of the island ; there is a green hillock 213 feet (64^m9) high, on the south-eastern extremity. Pagun do lies close westward of Sohwa do, and has a flat summit 321 feet (97^m8) high ; the narrow passage between these two islands should not be used. Pagun sudo, the passage between these two islands and the northern extremity of Taehwa do, is deep in the fairway, but the navigable width is reduced to about 2 cables by shoals extending from either side.

Hoe do (Ho yomu) lies about half a mile northward of Sohwa do, and its summit, 416 feet (126^m8) high, appears sharp when seen from southward. A pinnacle rock, 26 feet (7^m9) high, lies close off the north-western point of Hoe do and about half a cable westward of this rock are some rocks which dry 8 feet (2^m4). P'yŏngsŏk to is a flat islet, 69 feet (21^m0) high and covered with grass, lying about 1½ cables off the northern extremity of Hoe do ; this islet lies on a shoal with depths of less than 3 fathoms (5^m5) over it, which extends about half a mile north-eastward from Hoe do. Hoedo sudo, between Sohwa do and Hoe do, has depths of 7 fathoms (12^m8) and more in the fairway, but these depths decrease to from 3 to 4 fathoms (5^m5 to 7^m3) at the north-eastern end of the channel. Chung noe, a black rock which dries 19 feet (5^m8), lies about 1½ cables southward of Hoe do, and reduces the navigable width of the channel to about 4 cables.

T'an do (tō) is a rocky island lying with its south-western extremity about 2½ miles east-north-eastward of Hoe do. The summit of the island, situated slightly northward of the centre, is 992 feet (302^m4) high, but about 4 cables southward of it is a conical peak 935 feet (285^m0) high, which is more conspicuous from westward. T'an do is connected to Sohwa do by a bank with depths of less than 2 fathoms (3^m7) over it. Teadu do, situated nearly half a mile southward of the southern point of T'an do, is a grassy islet with a flat summit, 123 feet (37^m5) high. Tae roe, lying about half a mile south-eastward of Teadu do, consists of several black rocks from 4 to 6 feet (1^m2 to 1^m8) high ; Cho roe, lying about a quarter of a mile north-north-eastward of Tae roe, dries 12 feet (3^m7), and about 2 cables eastward of Cho roe is a rocky patch with depths of less than 6 feet (1^m8) over it. Two islets and a number of rocks lie on the bank, which dries, extending about one mile north-north-eastward from the northern end of T'an do ; the largest islet is 221 feet (67^m4) high.

Ung do (*Lat. 39° 33' N., Long. 124° 44' E.*), is a conical island, 528 feet (160^m9) high, situated about one mile north-eastward of the northern extremity of T'an do ; there is a prominent rock on its summit, and several others are scattered about its slopes. Sodae do is a small islet, 57 feet (17^m4) high, situated about 4 cables north-

Charts 1256, 1262, 2347.

Chart 1257.

westward of Ung do ; it has a few stunted trees on its southern part, and it is a useful mark for vessels proceeding to Tando myoji (Kato anchorage), which is described below.

- 5 Tan do (Ka to), separated from Ch'ölsan pando by Sonsa sudo, a channel about one mile wide, lies north-westward of T'an do, with a channel less than one mile wide between them ; it is densely wooded with low trees and indented by several bays, all of which dry. Its western part is a long narrow peninsula rising to an elevation of 361
10 feet (110^m0), connected to the main island by an isthmus only about one cable wide. Yöndae san, the summit of the island, is situated in the middle of the eastern part, and is 1,088 feet (331^m6) high. Sönch'ang p'o, a bay on the eastern part of the northern coast, which penetrates the island in a south-easterly direction, is backed by a
15 horseshoe-shaped ridge of hills, and a stone wall runs along its crest. Sömangch'i, a densely wooded, prominent point, 374 feet (114^m0) high, is situated in about the middle of the southern coast of Tan do ; Toi sō, a wooded islet 53 feet (16^m2) high, lies about 1½ cables southward of Sömangch'i. Chinsang got, the western point of Tan do,
20 is wooded with low trees ; Chông do, an islet 60 feet (18^m3) high, covered with coarse grass and scrub, lies about 2 cables westward of this point. Man do, 211 feet (64^m3) high, lies close inshore about 1½ miles northward of Chinsang got.

- A bank, which dries, extends as much as 1½ miles from the southern
25 coast of Tan do, and on the edge of this bank is a small islet 150 feet (45^m7) high, named Ak to, which has a dark appearance owing to its dense growth of trees ; a rock, which dries, lies about one cable eastward of Ak to. Pukhŭng noe, situated about half a mile eastward of Ak to, is a rocky reef, the highest part of which dries 21 feet (6^m4) ;
30 vessels should pass not less than 2 cables eastward of this reef, by keeping the northern point of Pagun do bearing about 225°, and well open south-eastward of the eastern side of Hoe do. Akto sudo is the channel between Hoe do and Ak to ; the fairway through it, with depths of from 4 to 8 fathoms (7^m3 to 14^m6), is about 4 cables wide.
35 Chang ju, a narrow shoal bank, with depths of less than one fathom (1^m8) over it in places, extends about 16 miles south-south-westward from the western end of Tan do, being separated from the chain of islands, which include Taehwa do and Hoe do, by a narrow channel. The southern end of the 3-fathom (5^m5) contour of this shoal is
40 marked by a light-buoy, painted in black and white horizontal stripes and exhibiting a *white group flashing* light showing two flashes every twenty five seconds, moored about 8 miles south-westward of Taehwa do.

- Tando myoji (Kato anchorage), situated in the channel between
45 Tan do and T'an do, is a sheltered anchorage with all winds. This channel is from three-quarters to one mile wide, and has depths of from 5 to 11 fathoms (9^m1 to 20^m1) in the fairway ; the bottom is mud and shingle or mud and sand, good holding ground.

- Light.**—A light is exhibited, at an elevation of 322 feet (98^m1),
50 from a white iron hexagonal framework structure, 78 feet (23^m8) in height, situated on the western extremity of Taehwa do (*Lat.* 39° 27' N., *Long.* 124° 35' E.).

Sönch'on man.—Islets and dangers.—**Anchorage.**—Sönch'ön man is the area bounded eastward by Samch'a do, Uri do and Sinmi do,

Charts 1256, 1262, 2347.

Chart 1257.

and westward by Taehwa do, T'an do, and Ch'ölsan pando. In addition to Chung ju (page 656) there are numerous shoals and banks which dry, all running in a general north and south direction ; the only good channels for vessels proceeding up to the head of this bay pass westward of Chung ju ; the track recommended passes eastward of the group including Taejôngjok to and between Teadu do and Tae roe.

T'ando myoji, sheltered from westerly and northerly winds, situated off the northern part of the eastern coast of T'an do, provides anchorage in a depth of 7 fathoms (12^m8), mud and sand, with the summit of Teadu do in line with the south-eastern extremity of T'an do, bearing about 211° . There is a valley, with a stream running down it, in the middle of the eastern coast of T'an do. This anchorage should not be confused with Tando myoji, which is on the other side of T'an do.

A large sandbank, which dries, lies at the head of Sönc'h'ön man and between Ung do and the south-eastern point of Ch'ölsan pando. There are three islands on the northern part of this sandbank ; Sogach'a do, the southernmost, lies about $3\frac{1}{2}$ miles northward of Ung do and is 375 feet (114^m3) high ; there is some cultivated land and a few houses on its western side, and a hillock on its northern end is thickly wooded. Taegach'a do, the middle and largest island, lies about half a mile northward of Sogach'a do and half a mile south-eastward of the south-eastern extremity of Ch'ölsan pando, and is 506 feet (154^m2) high ; there are a few houses and some cultivated land on its north-western side. There is a channel about 2 cables wide, with depths of 5 fathoms (9^m1) and more, between Taegach'a do and the south-eastern extremity of Ch'ölsan pando, but only small vessels can anchor in it, as there is a bar at each end. Uri do is situated close eastward of Taegach'a do, and is 254 feet (77^m4) high and covered with grass.

Chöp to lies nearly $2\frac{1}{4}$ miles eastward of Uri do and is 316 feet (96^m3) high ; the western extremity of the island is a peninsula with a conical peak on it 223 feet (68^m0) high, and there is a low dip between this peak and the summit of the island. The northern side of Chöp to is cultivated and there is a small village here. The coastal bank, which dries and on which Chöp to is situated, extends several miles from the coast here. There are several rocks above water between Chöp to and Uri do, the principal being Ch'öm do, 46 feet (14^m0) high, with a few trees on it, situated nearly half a mile eastward of the northern point of Uri do, and So do, a white rock 54 feet (16^m5) high, also having a few trees on it. There are a number of islets and rocks on the drying banks surrounding Chöp to, and between that island and the mainland ; Chöngju do, the southernmost of these, consists of three islets, the largest of which is 88 feet (26^m8) high, and lies about 2 miles south-westward of Chöp to.

There is good anchorage, in a depth of about 5 fathoms (9^m1), about three-quarters of a mile eastward of the southern extremity of Uri do (Lat. $39^\circ 38' N.$, Long. $124^\circ 46' E.$).

Directions.—A vessel bound for the anchorage at the head of Sönc'h'ön man, from a position 10 miles westward of Nap to (page 655) should steer for Chu san, bearing 015° , and seen midway between the western extremity of Chinsang got (page 658) and the summit of the 361-foot (110^m0) high hill just within that point ; Chu san, situated

Chart 1257.

about $5\frac{1}{2}$ miles north-north-eastward of Chinsang got, rises up from the southern part of the western coast of Ch'ölsan pando to three prominent peaks, the middle and highest of which is 1,238 feet (377^m3) high. When Unjong san, the summit of Sinmi do, bears 052°, and is just open south-eastward of the summit of Ch'uk to, steer on this mark, which leads about a quarter of a mile south-eastward of the rocks off Söjôngjok to; after passing this islet gradually alter course northward till the summit of T'an do bears 020°, which leads fully 6 cables westward of the large drying part of Chung ju. When the summit of T'an do is distant about 3 miles steer north-eastward through the channel, barely 4 cables wide, between Tedu do and Tae roe; after passing through this channel steer for the summit of Chöp to bearing 034°. When So do, the white rock 54 feet (16^m5) high at the head of Sönc'h'ön man, bears 011°, steer for it on that bearing, and anchor with Chu san in line with the southern side of Taegach'a do, bearing about 266°, in a depth of $5\frac{1}{2}$ fathoms (9^m6), mud and sand.

A vessel bound for Tando myoji, from a position 10 miles westward of Nap to, should steer for Chu san, bearing 015°, and seen midway between the western extremity of Chinsang got and the summit of the 361-foot (110^m0) high hill just within that point. When the summit of Uri do (the island south-westward of Sinmi do) is in line with Söjôngjok to, bearing about 072°, steer for the eastern side of Sömangch'i, the point on the southern coast of Tan do, bearing 027°. A peak 800 feet (243^m8) high, situated at the southern end of T'an do, bearing 062°, leads through Hoedo sudo (page 657). When the dip in Chöp to comes in line with the western side of Sodae do, bearing 044°, alter course to 039° for the anchorage, taking care to avoid Pukhüng noe. The shoalest part of the channel is south-eastward of P'yöngsök to (*Lat.* 39° 30' N., *Long.* 124° 37' E.), and the depth here is only about $3\frac{1}{2}$ fathoms (5^m9).

A vessel can also pass westward and northward of Hoe do by continuing with the eastern side of Sömangch'i bearing 027°, as previously directed, until the central peak on T'an do, 935 feet (285^m0) high, is in line with the northern side of P'yöngsök to, bearing about 072°, when gradually alter course to 076°, heading for a position slightly southward of the central peak on T'an do; when the northern extremity of Pagun do bears about 046°, and is well open south-eastward of Hoe do, alter course to 039° for the anchorage.

A vessel proceeding to Tando myoji must exercise the utmost caution, as the tidal streams are strong and the banks and shoals cannot be detected even in calm weather; it also appears probable that the channels are liable to change.

Ch'ölsan pando.—**Islets and dangers.**—**Anchorage.**—Ch'ölsan pando (Chorusan peninsula) is hilly, and its highest peak, 1,274 feet (388^m3) high, is situated about 4 miles north-north-eastward of Ch'a got, the southern extremity of the peninsula. Wörün do, an islet 159 feet (48^m5) high, covered with low trees except on its summit, lies close off the western point of the small peninsula which forms the southern extremity of Ch'ölsan pando.

Sönsa man is a narrow bay entered about 3 miles north-eastward of Ch'a got, and penetrates the middle of the south-eastern coast of Ch'ölsan pando for about a mile northward, but it dries throughout

Charts 1256, 1262, 2347.

Chart 1257.

and is much encumbered by rocks ; Sōnsa (Sensa) is a small village at the head of the bay. Yongch'on bong is a conical hill 412 feet (125^m6) high, with some prominent trees on its summit, situated on the eastern entrance point of Sōnsa man ; a black rock, 12 feet (3^m7) 5 high, lies about one cable southward of this point. The whole of this coast is fringed by a bank which dries and extends nearly one mile in places, and there are many rocks on it.

Yunsōng p'o is the south-eastern point of Ch'ōlsan pando and has a few houses on it. Kōrin got, the eastern extremity of the peninsula, is 10 situated nearly 2½ miles northward of Yunsōng p'o, and small vessels can anchor about 2 cables off it in depths of from 2 to 2½ fathoms (3^m7 to 5^m0), mud. Tang do is a small islet lying on a narrow shoal in mid-channel about half a mile eastward of Kōrin got. About half 15 a mile northward of Kōrin got the depths decrease abruptly to 6 feet (1^m8) and less, but boats can proceed up a channel between drying banks to Ch'ōng gang, situated about 4 miles northward of this point ; there are a number of islets and rocks on the banks bordering this channel ; the largest of these are Taesamgot to, 197 feet (60^m0) high, and Oe do, 163 feet (49^m7) high. Tongchang (Toguchayu) p'o lies 20 close northward of Kōrin got.

The western coast of Ch'ōlsan pando forms the eastern side of the estuary of Amnok kang (Oryoku kō) ; it is indented by several bays, but they are all filled by mud flats which dry. About 4 miles northward of Chu san is a point with a conical hillock on it, 165 feet 25 (50^m3) high, having some small trees on its summit ; rocks, which dry, extend half a mile southward from this point. About 6½ miles north-westward of Chu san is a rocky headland rising to a sharp peak 195 feet (59^m4) high ; close south-westward of this headland, and connected to it by a ridge of rocks which dries, is Sodaegye do, 30 an islet 250 feet (76^m2) high and covered with grass. Ōrang san is a prominent rocky hill, 828 feet (252^m4) high, situated about 3½ miles east-north-eastward of Sodaegye do ; Yōndae san (*Lat.* 39° 47' N., *Long.* 124° 33' E.), about 4 miles north-westward of Ōrang san, is an isolated hill rising steeply from a promontory on the western side of 35 the peninsula, and is a sharp peak 650 feet (198^m1) high.

Islets and dangers off the western side of Ch'ōlsan pando.—Ōyōng do (Oyon to) lies about 3 miles west-north-westward of Wōrūn do and is connected to the western side of Ch'ōlsan pando by banks which dry ; its summit is a conical peak, 289 feet (88^m1) high, with a large 40 boulder on top. A rock, which dries 11 feet (3^m4), lies about one cable off the eastern point of this islet, and about 6 cables eastward of this point are some black rocks which dry 12 feet (3^m7). A sandbank, known as Ō ju, with depths of only a few feet and one patch which dries on its northern half, and from 3 to 5 fathoms (5^m5 to 9^m1) on 45 its southern half, extends nearly 7 miles south-south-westward from a position about 3 cables westward of Ōyōng do. Chōng do lies about 1½ miles north-eastward of Ōyōng do, and its summit, 92 feet (28^m0) high, is covered with grass and is of a reddish colour ; drying rocks lies within half a mile northward and north-eastward of this 50 islet.

Wōl to, an islet 208 feet (63^m4) high, lies about 5 miles north-north-eastward of Ōyōng do, and about 1½ miles offshore, on the flat which dries out fully 2 miles offshore here ; it has a flat summit sparsely

Chart 1257.

covered with trees and there are a few houses on its north-eastern side. Several rocks, above water or drying, lie within half a mile of the western side of Wöl to ; Nondori, a rock 28 feet (8^m5) high, lies
 5 on the outer edge of the mud flat and about one mile south-south-eastward of Wöl to.

Taegye do, 410 feet (125^m0) high, lies nearly half a mile north-westward of Sodaegye do ; some rocks, which dry, lie close off its south-western point. A sandbank, named Kye ju, extends about 4
 10 miles southward from Taegye do ; the northern part dries for about 2½ miles, and there are depths of less than 3 fathoms (5^m5) on the remainder. Sön do (Mami to) is a conical islet, 137 feet (41^m8) high, situated about 1½ miles north-north-eastward of Taegye do ; Toremi (Lat. 39° 46' N., Long. 124° 34' E.), lying about half a mile eastward
 15 of Sön do, consists of some reddish rocks, the highest being 34 feet (10^m4) high.

*Charts 3652, 1257.***Anchorage off the western side of Ch'ölsan pando.—Directions.—**

Chungang ju is a narrow bank, about 7 miles long in a north and
 20 south direction, lying about midway between Taegye do and Wön do (En tō or Tsunguru somu), situated about 3½ miles south-westward and described on page 663 ; between this bank and Kye ju is a channel from 3 to 6 cables wide, with depths of from 4 to 8 fathoms (7^m3 to 14^m6), sand and mud, where anchorage can be obtained.
 25 A vessel intending to anchor in the channel between Chungang ju and Kye ju should approach with a peak 498 feet (151^m8) high, situated about 1½ miles north-eastward of Yöndae san, in line with the western side of Sodaegye do, bearing 022°. When Chu san is in line with Chöng do, bearing about 104°, course should be altered to 356°,
 30 steering for a flat-topped hill 308 feet (93^m9) high, with a single tree on its summit, situated on the mainland and about 7 miles north-north-westward of Yöndae san, and anchoring when Sön do bears about 063° in a depth of 6 fathoms (11^m0), mud and shells ; the maximum rate of the tidal streams here is 2½ knots.

*Chart 3652.***AMNOK KANG OR YALU CHIANG.—General remarks.—**

Amnok kang (Oryokū kō), so-called by the Koreans, and known to the Chinese as Yalu chiang (kiang), is the longest river in Korea and forms the boundary between Korea and China. It rises in approxi-
 40 mately Lat. 42° 10' N., Long 128° 20' E., and flows generally westward to Lin-chiang, in approximately Lat. 41° 50' N., Long. 127° 00' E., where it turns south-westward to the coast. Its total length is 427 miles, and rafts, principally used for carrying down timber from the vast forests which border the upper reaches, can proceed
 45 up for 375 miles ; on both sides of the lower reaches are vast stretches of arable land.

The mouth and estuary of the river are encumbered with numerous sand and mud banks. Large areas of these banks dry, and they are intersected by many channels which are constantly shifting. The
 50 only practicable channels are Tong sudo (Higashi suidō), on the eastern side of the estuary, and Sō sudo (Nishi suidō), on the western side. Sō sudo is the channel most generally used, as the northern part of Tong sudo is more liable to shift.

Charts 1256, 1262, 2347.

Chart 3652.

The fairway and depths in the river vary from year to year and from month to month, and the limits of the draught of vessels proceeding up the river are determined from time to time by the pilots. Vessels with a draught of 13 feet (1^m0) can usually reach the anchorage off Yongamp'o (Ryūganpo), situated on the eastern bank just above the junction of Tong sudo and Sō sudo, at high water, and navigation to Sinūiju (Shingishū), situated about 13 miles above Yongamp'o (*Lat. 39° 56' N., Long. 124° 22' E.*), would be extremely difficult for vessels with a draught of more than 10 feet (3^m0). 5 10

The bottom of the river is fine sand, and usually a vessel is not damaged if she grounds, but in some places there are sudden drops where the depths change abruptly from about 8 feet (2^m4) to 18 feet (5^m5), and a vessel grounding here may capsize when the tide falls; if a vessel gets across the stream after grounding she will cause an eddy which will scour out the sand above her and pile it up below, so that she will be gradually buried. 15

Cautions.—Owing to alterations in the banks and channels, the positions of the buoys and beacons are subject to frequent change without announcement. 20

When the river is closed to navigation by ice, the lights are extinguished and the buoys removed; the buoys may also be removed when the river is in flood.

Ice.—The river is practically closed to navigation from the end of October or beginning of November until the end of April or beginning of May. The ice starts to break up about three days later above the bridge at Sinūiju than it does below it; when it breaks, the drift ice in the main stream above Yongamp'o is confined by the action of the tides to a limited area, and practically none of it is seen outside the mouth of the river. 25 30

Pilotage.—Vessels should not attempt to navigate the river without a pilot. Vessels requiring the services of a pilot should apply to the office of the Pilots' Association at Sinūiju at least 24 hours before arriving off the entrance to Sō sudo. Pilots board vessels off No. W.2 light-buoy (page 667). There are three pilot boats, and they fly a flag the upper half of which is white and the lower half red. 35

Vessels requiring a pilot for Tong sudo are advised to pick one up at the entrance to Sō sudo, as they do not usually meet vessels off Tong sudo.

Tong sudo.—Islets and dangers.—Beacon.—Tong sudo (Higashi suidō), the eastern of the two practicable channels, leads into Tasado hang (Tashitō kō), described on page 665, which is the outer of the two ports at the entrance to Amnok kang. Pansōng yōlto (Banjō rettō), situated on the eastern side of Tong sudo, and about 5½ miles from its entrance, consists of four small islands and several rocky islets. Wōn do (En tō), the eastern and largest island, has a somewhat pointed summit 234 feet (71^m3) high; a reddish rock, 27 feet (8^m2) high, lies about a quarter of a mile southward of this island, and there are several rocks around which dry. Ch'aek (Satsu) to, lying about a quarter of a mile westward of Wōn do, is a flat-topped island 138 feet (42^m1) high, covered with grass. Chang do (Chō tō), 161 feet (49^m1) high, lies about half a mile westward of Ch'aek to, and there are two small islets between. Suun do (Suiun tō), the westernmost island of Pansōng yōlto, has a somewhat rounded top, 129 feet 40 45 50

Charts 1257, 1256, 1262, 2347.

Chart 3652.

(39^m3) high ; it is connected to Chang do by some rocks which dry, amongst which are two small islets. All these islands lie on Pan ju (Ban su), an extensive bank, which dries, extending about 3½ miles southward from the group and connected to the mainland northward ; this bank is prolonged for about 5½ miles south-south-westward with general depths of less than 3 fathoms (5^m5).

Pan ju forms the eastern side of Tong sudo, and the western side is formed by a series of banks more or less parallel to Pan ju, several of which are dry. There are ample depths and a minimum width of about three-quarters of a mile in the outer part of the channel, but it starts to shoal and narrow about 3 miles northward of Pansōng yōlto, and the inner part is mostly very shallow.

Un do (tō), 76 feet (23^m2) high, is a rocky islet lying about 2½ miles northward of Suun do ; it lies on the western side of Tong sudo and is a useful mark for that channel. Pyōk (Heki) to, 63 feet (19^m2) high, is a reddish, rocky islet lying about 1½ miles north-westward of Un do. Kach'a do (Kaji tō), situated about 3¼ miles north-north-eastward of Un do, is 122 feet (37^m2) high and devoid of trees, almost flat on top, and has a beacon on it. Taeyōndong do (Daiendō tō), 89 feet (27^m1) high, Soyōndong do (Shōendō tō), 92 feet (28^m0) high, and Mainori somu (*Lat.* 39° 47' N., *Long.* 124° 28' E.) lie within one mile north-eastward and eastward of Kach'a do. Tasa do (Tashi tō), situated about 1½ miles north-westward of Kach'a do, is 122 feet (37^m2) high and has two peaks, the northern being slightly the higher ; a rocky ledge extends about 2 cables south-westward from it, and some rocks, which dry, lie within half a mile northward of the island

Kwakkot ch'oe (Kakukanshi) is a rocky headland on the mainland and about 1½ miles northward of Tasa do ; the eastern side of this headland is precipitous, and a village is situated on the western side. Sodasa do (Shōtashitō) is a rocky islet lying about a quarter of a mile south-westward of Kwakkot ch'oe (*Lat.* 39° 49' N., *Long.* 124° 25' E.) ; this islet has been levelled, and it is connected to Kwakkot ch'oe by a sea-wall. Harbour works, described below, extend about one mile southward from Sodasa do. Saja do (Shishi tō) is a peak, 260 feet (79^m2) high situated nearly one mile northward of Kwakkot ch'oe. About 1½ miles eastward of Saja do is another isolated hill, about 214 feet (65^m2) high.

Se do (Sai tō), 95 feet (29^m0) high, is a rocky islet lying about 3 miles westward of Tasa do, and it appears pyramidal when seen from southward. Munbak (Monhaku) to, 50 feet (15^m2) high, lying nearly 2 miles northward of Se do, is an islet in the shape of a truncated cone, with some coarse grass on it ; there are some scattered rocks around. Munbak to lies on the north-eastern edge of a large bank, which dries, on the south-western side of Tong sudo.

Yōndae (Endai) san, a hillock 173 feet (52^m7) high, with the remains of an old beacon on its summit, is situated on a point about 4½ miles north-westward of Kwakkot ch'oe, and there is a sea-wall between these two points ; the village of Saho (Shōko) is situated at the western foot of Yōndae san, and landing can be effected here except at low water. Choryong do (Chōryū tō), 48 feet (14^m6) high, lies close off the point on which Yōndae san is situated. Tonjung ju (Tōchū su) is a large drying bank between Kwakkot ch'oe and Yōndae san, which extends up to 3 miles offshore, and diverts the channel to north-

Charts 1257, 1256, 1262, 2347.

Chart 3652.

westward. Mina (Mira) san, 314 feet (95^m7) high, is situated nearly 2½ miles east-north-eastward of Yōndae san, and Tōkch'ōn (Tokusen) san, 343 feet (104^m5) high, is about half a mile north-eastward of Mina san. About 2 miles north-westward of Yōndae san is a black 5
cliffy point 72 feet (21^m9) high, which forms the eastern point of the mouth of Amnok kang; Chang am (Shō gan), a black, flat-topped rock, 58 feet (17^m7) high, with a curiously shaped rock, 18 feet (5^m5) high, close north-westward of it, lies nearly half a mile southward of this point, and Maerori do (Mairori tō), a rock 39 feet (11^m9) high, 10
with a rock which dries 10 feet (3^m0) fully one cable south-westward of it, lies about 2 cables westward of the same point.

Lights.—Buoyage.—A light is exhibited, at an elevation of 166 feet (50^m6), from a white circular concrete tower, 27 feet (8^m3) in height, on Suun do. 15

A light is exhibited, at an elevation of 92 feet (28^m0), from a white square concrete structure on Un do.

A light-buoy, E. 1, painted black, and exhibiting a *white flashing* light *every six seconds*, is moored in the middle of the entrance to Tong sudo and about 5½ miles southward of Suun do. 20

Tong sudo is marked by red conical buoys on the eastern side, and by black conical buoys on the western side; these buoys are moved to conform with the changes in the banks and channel. See caution on page 663.

Tasado hang.—Anchorage.—Directions.—Tasado hang (Tashitō kō) 25
lies between Suun do and the eastern point of the mouth of Amnok kang; the harbour limits are indicated by pecked lines on the chart. Tasado myoji is situated off the western side of Tasa do. Vessels with a draught of about 15 feet (4^m6) can load and unload in Tasado myoji, the goods being transported to and from Sodasa do by lighters; 30
the best position is about half a mile westward of the northern peak on Tasa do, in depths of from 3¼ to 5½ fathoms (5^m9 to 10^m1), but there is only sufficient space here for one vessel at a time, and other vessels waiting usually anchor about 3 miles southward of Tasa do. The various banks, which dry, lying south-westward of Tasa do form a 35
natural breakwater.

A vessel proceeding to Tasado myoji can enter Tong sudo by passing either side of the light-buoy at the entrance; thence proceed in mid-channel westward of Suun do and eastward of Un do (*Lat.* 39° 44' N., *Long.* 124° 24' E.), and proceed up to the anchorage 40
keeping the red conical buoys on the starboard hand and the black conical buoys on the port hand. Local knowledge is necessary.

An artificial port which lies on reclaimed land between Tasa do and Sodasa do provides 2,445 feet (745^m2) of berthing space with depths of from 26 to 30 feet (7^m9 to 9^m1) alongside, and 2,000 feet (609^m6) of 45
berthing space with depths of from 12 to 16 feet (3^m7 to 4^m9) alongside. The depth in the approach channel was reported, in 1949, to be 20 feet (6^m1).

The port is connected by rail to Yongamp'o and Sinūiju. It is used for shipping aluminium and iron, and was still in process of 50
completion in 1949.

Tidal Streams.—In Tasado myoji and on the western side of Suun do the tidal streams run in the direction of the channel. At spring tides in summer the tidal streams at Tasa do turn about one hour

Chart 3652.

after high and low water, respectively. On the western side of Suun do the north-going stream runs for about 5 hours from one to 2 hours after low water till high water ; i.e. from about half an hour before to about $4\frac{1}{2}$ hours after the time of high water at Inch'ön (Admiralty Tide Tables Standard Port). The south-going stream runs for about $7\frac{1}{2}$ hours from high water till one or two hours after low water ; i.e. from about $4\frac{1}{2}$ hours after high water to half an hour after the next high water at Inch'ön. The maximum rates during spring tides at Tasa do are $3\frac{1}{4}$ knots for the north-going stream and $4\frac{1}{4}$ knots for the south-going stream ; westward of Suun do the maximum rates are $2\frac{1}{4}$ and $2\frac{3}{4}$ knots, respectively.

So sudo.—**Islands and dangers.**—**Caution.**—**Anchorage.**—Sō sudo (Nishi suidō), the western of the two practicable channels, is generally used by vessels bound for Yongamp'o or for places further up the river. The fairway is very liable to change, and the marks for it are being constantly altered ; vessels should, therefore, employ a pilot. Mudbanks extend for some miles off the coast, and there are few landmarks.

Sindo yōlto (Shintō rettō) consists of one island and several islets and rocks which lie in the middle of the estuary of Amnok kang and on the eastern side of Sō sudo, and the whole group is surrounded by drying banks. Sin do (Shin tō), the largest island, lies in the centre of the group, about 8 miles westward of Tasa do ; it is nearly 300 feet (91^m4) high, and rises to sharp peaks at its northern and southern ends, and there is flat, cultivated land between them. There are several islets eastward of Sin do ; the largest of these, named Ch'uk (Chū) to is 128 feet (39^m0) high, and lies nearly one mile eastward of Sin do ; the others include Kuyōng do (Kyūei tō), 66 feet (20^m1) high, Saja do (Shishi tō), 115 feet (35^m0) high, Datum rock (*Lat.* 39° 48' N., *Long.* 124° 16' E.), 5 feet (1^m5) high, Nojok (Roseki) to, 92 feet (28^m0) high, Mal (Matsu) to 95 feet (29^m0) high, and Chang do (Chō tō), 82 feet (25^m0) high. Pusōgak (Fusho kaku) is an isolated black rock, 40 feet (12^m2) high, situated nearly $1\frac{1}{4}$ miles north-eastward of the northern point of Sin do. Yōng do (Ei tō), 82 feet (25^m0) high, Ae do (Gai tō), 105 feet (32^m0) high, Maül (Baotsu) to, and Chōngjog am (Teisoku tō), 61 feet (18^m6) high, lie southward of Sin do. Maan do (Baan tō), 237 feet (72^m2) high, lies nearly one mile westward of Sin do and is the largest of the islets on the western side, which include also Somaan do (Shōbaan tō), 145 feet (44^m2) high, Ch'ogae do (Sōkai tō), 95 feet (29^m0) high, and Tal (Tatsu) tō, 102 feet (31^m1) high. A large area of the bank northward of Maan do and Sin do is covered with grass and only covers at high water spring tides.

The portion of the mainland which forms the north-western side of the estuary of Amnok kang is flat, cultivated, and intersected by several streams. K'u-lung-shan chiao, the western entrance point of the estuary, is situated about $8\frac{1}{2}$ miles westward of Maan do, and mud flats which dry extend for about 3 miles in its vicinity ; K'u-lung shan is an isolated, thickly wooded hillock, 122 feet (37^m2) high, situated about three-quarters of a mile north-eastward of this point, and appears as an islet from a distance.

The entrance to Sō sudo lies about 5 miles southward of K'u-lung-shan chiao, whence it runs north-eastward between drying banks

Charts 1257, 1256, 1262, 2347.

Chart 3652.

for about 9 miles to meet the coast about 2 miles north-westward of Maan do. Further northward, the channel runs between the coast-line and the banks in the centre of the estuary northward of Sindo yölto. Two rocks, each 8 feet (2^m4) high, lie in the fairway of the channel north-westward of Maan do; the rocks are about three-quarters of a cable apart and the channel passes between them. 5

Ta-tung-kou (Tatungkow) is a town on the coast on the western side of the estuary of Amnok kang and is situated about 5 miles north-westward of Sin do; timber is exported. This town lies about 2 miles from the nearest point on Sō sudo, but can be reached through a narrow channel, entered from Sō sudo about 2 miles north-westward of Maan do; junks anchor in Sindo myoji (Shintō byōchi), off the entrance to this channel and proceed up to Ta-tung-kou with the tide. The Custom house, consisting of two prominent red brick buildings, is at the south-western end of the town and the landing place is in front of it. Chao-shih-kou (Chaoshihkow) is a village situated about 2 miles east-north-eastward of Ta-tung-kou and at the mouth of a small river; landing can be effected here at all times. Ch'ang shan (Lat. 39° 57' N., Long. 124° 03' E.) is a bare peak 526 feet (160^m3) high, 20 situated nearly 6 miles north-westward of Ta-tung-kou, and a range of hills extends about 4 miles south-westward from this peak; this district is fairly densely wooded.

Northward of Sindo yölto, Sō sudo is separated from Tong sudo by a large bank which extends about 7 miles northward from Sin do. The northern part of this bank is just above water, and the remainder dries. Parts of the northern end are named, respectively, Yongmun-gang (Geimonkō), Sōjung ju (Seichū su) and Sinch'okp'yōng (Shin-tekihei). 25

Light.—Buoyage and beacons.—A light is exhibited, at an elevation of 245 feet (74^m7), from a white circular brick tower, 26 feet (7^m9) in height, situated on the south-western peak of Maan do. 30

A light-buoy, W.2, painted red, and exhibiting a *white flashing light every three seconds*, is moored off the entrance to Sō sudo and about 10½ miles south-westward of Maan do. 35

Red conical buoys mark the eastern side of the fairway, and black conical buoys the western side. There are also several beacons. See caution on page 663.

Tidal streams.—Near Sindo yölto the tidal stream runs north-eastward with the rising tide for a duration of about 5 hours, commencing about 1½ hours after low water at Suun do; i.e. about half an hour before the time of high water at Inch'ōn (Admiralty Tide Tables Standard Port); the maximum rate is 3½ knots. With the falling tide the stream runs south-westward for a duration of about 7 hours, starting about one hour after high water at Suun do; i.e. about 5 hours after the time of high water at Inch'ōn; the maximum rate is about 3½ knots. 40

Outside the entrance to Sō sudo and south-westward of Sin do the tidal stream with the rising tide runs north-eastward from about one hour before to about 5½ hours after the time of high water at Inch'ōn; and with the falling tide, south-westward from about 5½ hours after the time of high water to about one hour before the next high water; the maximum rate is 1½ knots. 50

The river.—Tidal streams.—Buoyage.—Tong sudo and Sō sudo

Chart 3652.

unite just within the entrance to Amnok kang ; the fairway then runs eastward for about 2 miles towards Yongamp'o and then turns abruptly northward. The fairway is marked by red conical buoys on the eastern side, and black conical buoys on the western side.

Yongamp'o hang (Ryūganpo harbour), the harbour of Yongamp'o (Ryūganpo) extends from Sin do (*Lat. 39° 48' N., Long. 124° 14' E.*) to about 5 miles above the town, and has a common boundary with Tasado hang ; the harbour limits are indicated by pecked lines on the chart. It affords indifferent anchorage, with no facilities for working cargo, and is only available for vessels not exceeding 13 feet (4^m0) in draught; owing to the strong currents and tidal streams communication with the shore is sometimes impracticable.

Hwanch'op'yōng (Kōsōhei) and Tongdaep'yōng (Tōdaehei) are low islands situated in the river between Yongamp'o and the northern harbour limit, where Samgyō ch'ōn (Sankyō-sen) flows into Amnok kang from eastward.

San-tao-lang-t'ou (Santaolangtow) is situated on the western bank of the river and about 6½ miles northward of Yongamp'o; there is a Custom house here and some quays; cargo is transported to and from An-tung by lighters. There is anchorage off the town for small vessels in San-tao-lang-t'ou mao-ti (Santaolangtow byōchi). The maximum rate of the flood stream in ordinary circumstances is 3 knots and that of the ebb stream 3½ knots, but when the river is in flood the ebb stream may attain a rate of 5 knots, whilst the flood stream is scarcely perceptible.

Yuch'o do (Ryūsō tō) and Tongyuch'o do (Tōryūsō tō) are low islands lying on a drying bank in the middle of the river just above San-tao-lang-t'ou.

Sinūiju (Shingishū) is situated on the eastern bank of the river and about 13 miles above Yongamp'o, and is the terminus of the Korean railway, although the trains run across the bridge just above the town and connect at An-tung station with the Chinese system. Local storm signals are displayed; see page 28. The bridge is 33 feet (10^m1) above mean water level; there are customs' officials, police and a guard at each end. There is good holding ground, sand and mud below the bridge, in a depth of about 10 feet (3^m0), but the river is continually changing; the usual landing place is at the Customs pier.

The southern harbour limit of Sinūiju is indicated by a pecked line on the chart close southward of San-tao-lang-t'ou; it is also the northern limit of the port of Yongamp'o.

An-tung (*Lat. 40° 08' N., Long. 124° 23' E.*), is situated opposite Sinūiju and on the Chinese side of the river. It has a considerable trade, but only about half is sea borne. The anchorage off the town is deeper than that off Sinūiju, but a shoal, with a depth of about 2 feet (0^m6) over it, situated about 2½ miles below the railway bridge, prohibits the passage of power vessels of any size. There are bunds where small vessels and lighters can lie alongside.

Light.—A light is exhibited, at an elevation of 205 feet (62^m5), from a red hexagonal masonry tower, 33 feet (10^m1) in height, situated on the summit of a hill about half a mile south-westward of Yongamp'o. This light is known as Samp'o light. See caution on page 663.

Charts 1257, 1256, 1262, 2347.

CHAPTER XIII

THE NORTHERN SIDE OF YELLOW SEA—FROM
YALU CHIANG TO LŪ-SHUN CHIANG.*Chart 1256.***COAST.—Yalu chiang to Ch'eng-shan t'ou.—General remarks.—**

The coast between K'u-lung-shan chiao (page 666), the western entrance point of the estuary of Yalu chiang and the mouth of Ta-yang ho, situated about 15 miles westward, is low, with hills rising 5 some miles inland, and is fringed by a mud bank which dries out about 3 miles.

Between the mouth of Ta-yang ho and the mouth of Pi-liu ho (Hekiryū ka) (chart 3388), situated about 55 miles west-south-westward, the coast is mostly hilly and is indented by several bays, 10 between which are prominent headlands. Except off some of the salient points the whole of this coast is fronted by mud flats, which dry out for one or more miles and completely fill the bays; the depths are shoal for some distance seaward.

Chart 3388.

From the mouth of Pi-liu ho to Ch'eng-shan t'ou (Jōsan tō), 15 situated about 26 miles south-westward, the land near the coast becomes lower, and the coastal mud bank dries out for from 2½ to 4 miles until about 10 miles north-eastward of Ch'eng-shan t'ou; there are numerous salt pans along this part of the coast. 20

*Chart 1256.***Ta-yang ho and approaches.—Islands and dangers.—Buoys.—**

Anchorage.—Several islands and islets lie on the banks at the mouth of Ta-yang ho. Ta-lu tao (tau), the southernmost and largest 25 island, lies about 4 miles offshore, and 12 miles west-south-westward of K'u-lung-shan chiao, and has a double summit, 614 feet (197^m1) high, the highest point of which appears as a sharp peak from a distance; on the southern side of the island is a sandy beach which dries out about 6 cables. Mang shan (*Lat. 39° 45' N., Long. 123° 45' E.*), an islet 221 feet (67^m4) high, lies close off the eastern point 30 of Ta-lu tao and is connected to it by a reef which dries. The main channel leading to Ta-yang ho is entered about 1½ miles northward of Mang shan, and runs westward for about 2 miles before turning north-north-westward towards the river entrance. There is a bar which almost dries at spring tides, northward of Ta-lu tao, and within 35 this bar the depths nowhere exceed 8 feet (2^m4). The channel northward of Ta-lu tao is marked by two black conical buoys and one red conical buoy.

Charts 1262, 2347.

Chart 1256.

Hsiao-lu tao (Siau-lu tau) lies about 3 miles north-eastward of Mang shan and is a flat-topped island, 240 feet (73^m1) high ; a rocky ledge, which dries and has several rocks above water on it, extends
 5 about 6 cables south-eastward from the south-eastern point of this island, and there is a rock, 100 feet (30^m5) high, close off its south-western side. Several drying rocks lie about 3½ miles offshore about 3 miles eastward of Hsiao-lu tao. A rock, 116 feet (35^m4) high, lies
 10 about one mile westward of Hsiao-lu tao, with a group of rocks, 8 feet (2^m4) high, named Mien-yang shih, about half a mile north-eastward of it ; two drying rocks lie within one mile north-westward of Mien-yang shih.

Nan-wei-tzu chiao, the western point of the mouth of Ta-yang ho, is the extremity of a narrow peninsula, about 2 miles in length,
 15 which attains an elevation of 99 feet (30^m2) at its southern end. Tan t'o-tzu, situated about 2 miles eastward of Nan-wei-tzu chiao, is an islet 212 feet (64^m6) high lying on the edge of the coastal bank which dries ; it is the southernmost of a group extending nearly 4 miles north-eastward from Nan-wei-tzu chiao, and including the
 20 large island of Hsia t'o-tzu, 185 feet (56^m4) high, and numbers of islets and rocks.

Ta-ku-shan po-ti is situated outside the mouth of Ta-yang ho, and anchorage can be obtained about 3 miles south-south-eastward of the eastern point of Ta-lu tao, in a depth of about 4½ fathoms (8^m7) ;
 25 smaller vessels can anchor about 1½ miles southward of this point, sheltered from north-westerly winds, in depths of from 3 to 3½ fathoms (5^m5 to 6^m9), mud. Large junks anchor in the roadstead and discharge their cargoes into lighters ; smaller junks proceed up the river and anchor off the city of Ta-ku-shan, which lies on the
 30 western side of the entrance. The river is frozen over from the end of November till the beginning of March. Ta-ku shan rises steeply to an elevation of 1,101 feet (335^m6) immediately northward of the city and is very prominent ; there are two large shrines and a dense growth of trees in a ravine on the seaward side of the hill.

35 **Light.**—A light is periodically exhibited, at an elevation of 248 feet (75^m6), from a white circular steel tower, 28 feet (8^m5) in height, situated on Mang shan (*Lat.* 39° 45' N., *Long.* 123° 45' E.).

Coast.—Islets and dangers.—Between Nan-wei-tzu chiao and Tun-t'ai shan, a point situated about 4 miles westward, there is a bay
 40 filled by a drying mud flat, on which there are several rocks above water. Foul ground extends about one mile southward from Tun-t'ai shan. Ch'ing-tui-tzu wan (Cheng-tsui-szu) is entered between Nan-chien chiao, a point situated about 3 miles west-south-westward of Tun-t'ai shan, and Wen-chia-lou, situated about 6½
 45 miles further west-south-westward. Ch'ing-tui-tzu wan is filled with a drying mud flat, on which there are a few rocks above water ; a narrow and shallow channel runs to the head of the bay. Styena point is situated about 15 miles west-south-westward of Wen-chia-lou, and rises to Kuan-chia shan, lying about 3½ miles north-westward
 50 and 764 feet (232^m9) high. Tung tao-tzu is situated about 2½ miles north-eastward of Styena point and lies off the western entrance point of Chuang-ho wan ; Chuang ho and a few other streams flow into this bay. Ko-li tao, 355 feet (108^m2) high, situated about 4 miles eastward of Styena point, is the largest of a number of islets and rocks

Charts 1262, 2347.

Chart 1256.

lying on the drying mud flats off the coast between Styena point and a point lying about 8 miles eastward, from which foul ground extends about $1\frac{1}{2}$ miles south-westward.

Western peak, 1,810 feet (551^m7) high, is situated about 19 miles 5 northward of Styena point, and about 10 miles north-north-westward of Western peak is Pu-yün shan (Mount Konus Dalni), 3,730 feet (1,136^m9) high, both being prominent.

Off-lying dangers.—A shoal, with a depth of $2\frac{1}{4}$ fathoms (4^m1) over it, lies about 23 miles southward of Ta-lu tao (*Lat.* 39° 45' N., *Long.* 10 123° 43' E.).

Huang-shih chiao (Beaver rock) lies about $6\frac{1}{2}$ miles southward of Nan-chien chiao and dries 17 feet (5^m2).

Tang-hsia tao (Seal rock), lying about 7 miles westward of Huang-shih chiao and $4\frac{1}{2}$ miles southward of Wen-chia-lou, is a 15 prominent pillar rock about 20 feet (6^m1) high.

Tung-ta chiao (Tota shō), a rock, with a depth of about one foot (0^m3) over it, lies about 5 miles west-south-westward of Tang-hsia tao. It is possible that other rocks may exist in this vicinity.

Charts 3388, 1256.

Coast.—Islets and dangers.—Beacon.—From Styena point the coast trends about 20 miles west-south-westward to the entrance of Pi-liu ho (Hekiryū ka), and is fronted by a mud flat, which dries out over one mile offshore in most places, and completely fills 25 all bays.

Chart 3388.

Yü tao-tzu (Utōshi) is a peninsula situated about 12 miles west-south-westward of Styena point; it is 82 feet (25^m0) high, and has the appearance of an island. Kai-tzu t'ou (Koshi tō), situated about $2\frac{3}{4}$ miles south-westward of Yü tao-tzu, is the eastern entrance 30 point of Sha-ho-tzu k'ou (Shakashi kō), a large inlet in which there are some rocks above water, including Ta t'o-tzu (Dai dashi), 43 feet (13^m1) high, and Erh t'o-tzu (Ni dashi); a rocky reef extends about half a mile south-westward from Kai-tzu t'ou.

The mudbank, on which are several islets, dries out for as much as 35 3 miles from the coast at the mouth of Pi-liu ho, and at low water there is only a narrow, shoal channel leading to the entrance. Among these islets are Chiao tao-tzu (Kōtōshi), on which there is a beacon; Huang-kua tao (Kōka tō), Yüan-tsui t'o-tzu (Ōsui dashi), Ch'ien tao-tzu (Sentōshi), and Niu-hsin t'o-tzu (Gyushin 40 dashi); details of all these can best be seen from the chart. Chien shan (Sen san), a prominent green hill 292 feet (89^m0) high, is situated on the eastern side of the entrance to Pi-liu ho. Ch'eng-tzu-t'uan (Joshidoton) is a village on the western side of the river and about 4 miles within the entrance.

P'i-tzu-wo (Hishika) is a large town situated on the coast about 11 45 miles west-south-westward of the western entrance point of Pi-liu ho, and there are numerous salt pans along the coast between. P'i-tzu-wo is a harbour for junks, and is somewhat protected by a ridge of rocks which extends about 4 cables southward from a point close eastward 50 of the town; the coastal bank dries out for nearly 2 miles here, however, and junks are often left high and dry. P'i-tzu-wo (*Lat.* 39° 24' N., *Long.* 122° 20' E.) is connected to the general railway system; there is a storm signal station, maintained locally.

Charts 1262, 2347.

Chart 3388.

Ma-i tao (Bagi tō), an islet 135 feet (41^m1) high, lies nearly 3½ miles eastward of P'i-tzu-wo and on the edge of the drying part of the coastal bank. Niu-hsin tao (Gyushin tō), an islet 86 feet (26^m2) high, lies nearly 1½ miles southward of P'i-tzu-wo. P'ing tao (Heitoshi), 99 feet (30^m2) high, is situated nearly 2 miles south-south-westward of Niu-hsin tao, and the coastal bank dries out as far as this island; reefs and rocks extend fully half a mile from its south-eastern and eastern sides, and include Lao-mu-chu chiao (Rōbocho shō), 36 feet (11^m0) high. Ti chiao (Chi shō), a rock which dries 11 feet (3^m4), lies nearly 1½ miles eastward of P'ing tao, and Ch'ung chiao (Oki shō), a rock which dries 12 feet (3^m7), lies about 4 cables south-eastward of Ti chiao. Besides the above, there are several drying rocks inside the one-fathom (1^m8) line in the same general vicinity.

Ta-sha ho (Daisha ka) flows out about 5 miles westward of P'ing tao, but the approach to it dries entirely. Ch'ing-t'ai shan (Seidai san), a hill 286 feet (87^m2) high, is situated on the coast about 2½ miles southward of the entrance to this river. The broad mudbank, which dries, and has hitherto fringed this coast, practically disappears at T'ao-yüan chia (Toen kō), a point situated about 1½ miles south-westward of Ch'ing-t'ai shan. Hei tao (Koku tō), situated about 2½ miles eastward of Ch'ing-t'ai shan, is 161 feet (49^m1) high.

Ma t'o-tzu (Ba dashi), situated about 6½ miles south-westward of Hei tao and nearly 3 miles northward of Ch'eng-shan t'ou, is 69 feet (21^m0) high; a spit, which dries, extends about 1½ miles north-westward from Ma t'o-tzu, and a group of rocks, which dry, lies about 1½ miles north-north-eastward of this islet. There are numerous rocks, above water or drying, inside the one-fathom (1^m8) line between Hei tao and Ma t'o-tzu.

Lights.—A light, for the use of aircraft, is occasionally exhibited, at an elevation of 190 feet (57^m9), from a white iron framework tower, 49 feet (14^m9) in height, situated close westward of P'i-tzu-wo.

Chart 1256.

Teng-sha-ho light, for the use of aircraft, is exhibited, at an elevation of 158 feet (48^m2), from an iron framework tower, 36 feet (11^m0) in height, situated about 8 miles west-south-westward of Ch'ing-t'ai shan.

Chart 3388.

Yen-ta ao.—**Dangers.**—**Anchorage.**—Yen-ta ao (Endai ō), entered between Ma t'o-tzu and Ch'eng-shan t'ou, has depths of less than 3 fathoms (5^m5) except over a small area northward of the latter, and several rocks, above water and drying, are situated inside the one-fathom (1^m8) line. Tan t'o-tzu (Tan dashi), lying about one mile north-eastward of Ch'eng-shan t'ou (Jōsan tō), has the appearance of four rocks lying close together, the highest rock being 184 feet (56^m1) high; a rock, which dries one foot (0^m3), lies about three-quarters of a mile east-north-eastward of Tan t'o-tzu. Two rocks, with depths of 8 and 15 feet (2^m4 and 4^m6) over them, lie about three-quarters of a mile southward and one mile south-south-eastward, respectively, of Ma t'o-tzu. Ch'eng-shan t'ou (*Lat.* 39° 09' N., *Long.* 122° 10' E.) is a bluff 391 feet (119^m2) high, with cliffs extending half a mile along its southern face, and is connected to the mainland by a narrow sandy isthmus.

Charts 1262, 2347.

Charts 3388, 1798.

Hsi-ta (Nan-tai) shan is a prominent peak, 1,066 feet (324^m9) high, situated about 5 miles westward of Ch'eng-shan t'ou. A river flows into the head of Yen-ta ao, and there are salt pans at its mouth. Vessels loading salt usually anchor about a quarter of a mile off the southern shore of the bay, with Ma t'o-tzu bearing not more than 012°, sheltered from southerly winds. 5

Chart 3388.

OFF-LYING ISLANDS.—Bourchier group.—Shih-ch'eng tao (Sekijō tō), the northernmost and largest island of Bourchier group, lies 10 with its northern extremity about 4 miles southward of Styena point (page 670), and the passage between it and the main coast is shoal. The north-western part of the island is low, but a range of hills in the south-eastern part rises to an elevation of 702 feet (214^m0). There is a bay on the northern coast, but it dries throughout; Pei tsui 15 (Hokusui) is its western entrance point, and the northern point of the island. A bank dries out for as much as one mile from the north-western coast, and Shu t'o-tzu (Ju dashi), 46 feet (14^m0) high, and Hei chiao (Koku shō), 26 feet (7^m9) high, lie near its outer edge. Wa-lung (Garyū), a rock 5 feet (1^m5) high, and a rock which dries 20 8 feet (2^m4), lie, respectively, nearly one mile north-north-westward and nearly 2 miles north-eastward of Pei tsui.

A rock, with a depth of about 4 feet (1^m2) over it, was, in 1937, reported to lie about 1½ miles east-north-eastward of Pei tsui. Ch'ing-shu tao (Seisho tō), a rocky islet 88 feet (26^m8) high, lies about 25 three-quarters of a mile off the north-eastern coast, and about one mile southward of this islet is Hsing-chia t'o-tzu (Kyōka dashi), another rocky islet, 124 feet (37^m8) high. Lao-mu-chu chiao (Rōbocho shō), consisting of some rocks, one of which is 3 feet (0^m9) high, lies about 7 cables off the south-eastern coast of Shih-ch'eng 30 tao. Hun-shun t'o-tzu (Konsui dashi), a rocky islet 59 feet (18^m0) high, lies about three-quarters of a mile south-westward of the western point of Shih-ch'eng tao, and within a distance of one mile south-eastward of Hun-shun t'o-tzu are two rocks, which dry 12 feet (3^m7). 35

Shou-lu tao (Sōroku tō) lies with its northern extremity about 2 miles south-eastward of the eastern point of Shih-ch'eng tao and is 370 feet (112^m8) high. A spit, with a rock which dries 15 feet (4^m6) on its outer end, extends nearly half a mile north-westward from the north-western point of Shou-lu tao, and a bank extends about three-quarters of a mile off the western side of this island. San-leng chiao 40 (Sanryō shō), a rock, 68 feet (20^m7) high, lies on the edge of the shore bank about one mile westward of the southern extremity of this island, and a drying bank extends about 3½ cables northward from it; a rock, which dries 2 feet (0^m6), lies about 2 cables south-westward of 45 San-leng chiao. Foul ground extends a short distance from the southern extremity of Shou-lu tao and a rock, which dries 12 feet (3^m7), lies about 1½ cables eastward of this extremity.

Yüan-pao t'o-tzu (Genro dashi) lies nearly one mile eastward of Shou-lu tao, and is 223 feet (68^m0) high; a rocky ridge extends about 50 a quarter of a mile south-westward from its north-western extremity and terminates in a rock 27 feet (8^m2) high. Hsiao-wang-chia tao (Shōōka tō) (*Lat.* 39° 30' N., *Long.* 123° 06' E.) lies about half a mile

Charts 1256, 1262, 2347.

Chart 3388.

north-eastward of Yüan-pao t'o-tzu, and is 252 feet (76^m8) high. A rock, one foot (0^m3) high, lies about 3 cables northward of the northern point of Hsiao-wang-chia tao, and about one mile north-
 5 north-westward of this rock is a large shoal, with a least depth of 10 feet (3^m0) over it, which lies at the southern end of a spur extending southward from the shore bank fronting the mainland northward. A rock, 29 feet (8^m8) high, lies about 2 cables east-north-eastward of the northern point of Hsiao-wang-chia tao, and a rocky islet, 132
 10 feet (40^m3) high, lies close off the south-eastern point of this island.

Ta-wang-chia tao (Daiōka tō), the southernmost of Bouchier group, lies about 4 miles south-eastward of Shih-ch'eng tao; the summit of this island, 485 feet (147^m8) high, is situated on the southern extremity, and near the centre of the island is a peak 344
 15 feet (104^m8) high. A rock, which dries 6 feet (1^m8), lies about 3 cables southward of the southern point of Ta-wang-chia tao; Pai-shih chiao (Hakuseki shō), 94 feet (28^m7) high, is the outermost of a group of rocks which extend about 6 cables south-eastward from the eastern point of the island; Hei-shih chiao (Kokuseki shō),
 20 91 feet (27^m7) high, lies close north-westward of Pai-shih chiao. The bay between the southern and eastern points has several rocks and reefs in it. There is anchorage in the outer part of a bay on the southern side of Ta-wang-chia tao, but the inner half is occupied by a reef, and some rocks, which dry 16 feet (4^m9), lie about 2 cables
 25 south-westward of the eastern entrance point. The northern part of the western coast of the island is fringed with rocks and reefs to a distance of about 3-cables offshore. See view facing this page.

There are some wells on the island and it has been reported that water can be supplied to ships in small sampans, each carrying about
 30 half a ton.

A chain of islets and rocks extends from the eastern extremity of Ta-wang-chia tao to the southern extremity of Shou-lu tao. T'an t'o-tzu (Tan dashi), the southernmost islet, lies nearly 1½ miles northward of the eastern point of Ta-wang-chia tao, and is 196 feet
 35 (59^m7) high; Ch'iao-mai-leng-tzu (Kyōbakuryōshi), 42 feet (12^m8) high, and a rock which dries, lie in the channel between them. T'an tao (Chō dashi), the largest islet, lies about 2 cables north-north-westward of T'an t'o-tzu and is 157 feet (47^m8) high; Ching t'o-tzu (Sei dashi), 95 feet (29^m0) high, lies nearly half a mile north-westward
 40 of the northern point of T'an tao, and is connected to it by a reef. Ts'ao t'o-tzu (Sō dashi), the northernmost islet, lies nearly half a mile eastward of the southern point of Shou-lu tao, and is 111 feet (33^m8) high.

Lights.—A light is exhibited, at an elevation of 79 feet (24^m1),
 45 from a white circular, concrete structure, 14 feet (4^m3) in height, on San-leng chiao.

A light is exhibited, at an elevation of 336 feet (102^m4), from a white circular concrete structure, 33 feet (10^m1) in height, on the southern extremity of Ta-wang-chia tao (*Lat.* 39° 26' N., *Long.* 123°
 60 05' E.).

Wu-mang tao and adjacent islets.—Wu-mang tao (Gōbō tō) lies about 11 miles south-south-westward of Ta-wang-chia tao, and has a conical summit 689 feet (210^m0) high.

Pei t'o-tzu (Hoku dashi), situated about one mile northward of

To face page 674.

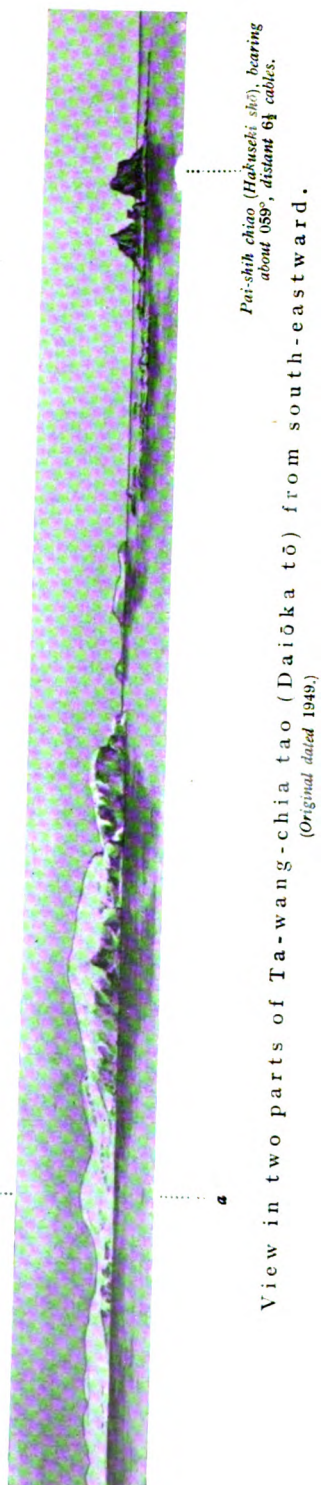
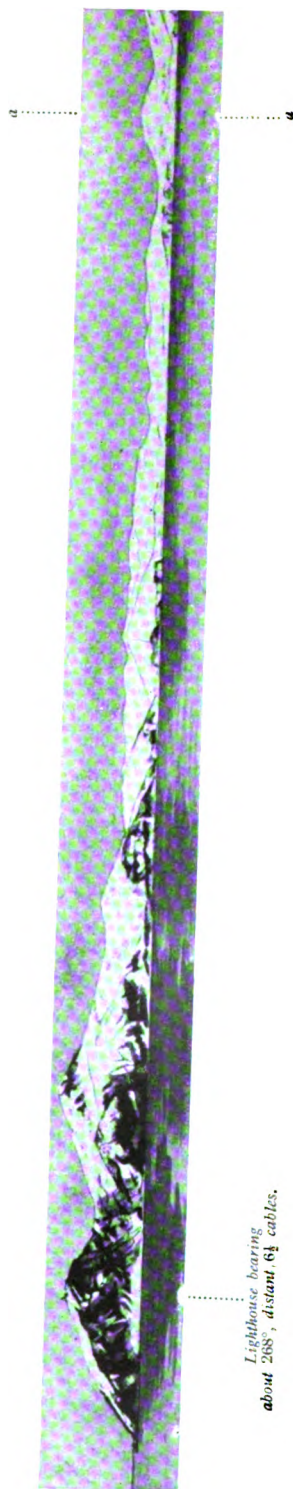


Chart 3388.

the western extremity of Wu-mang tao, is a rocky islet 135 feet (41^m1) high. Ch'ien t'o-tzu (Zen dashi), a rocky islet 240 feet (73^m1) high, lies about half a mile eastward of Pei t'o-tzu; a rock above water lies close off the western point of Ch'ien t'o-tzu, and a similar 5 rock lies about one cable off the eastern point of this islet. Within a distance of three-quarters of a mile eastward of Ch'ien t'o-tzu is Erh t'o-tzu (Ni dashi), a group of three rocky islets, the middle one of which is 135 feet (41^m1) high. Ta t'o-tzu (Dai dashi) is another group of three rocky islets lying about 1½ miles eastward of Ch'ien 10 t'o-tzu; the eastern and highest islet is 158 feet (48^m1) high.

Hai-yang tao.—Off-lying islets and dangers.—Hai-yang tao (Kaiyō tō) lies about 12 miles south-eastward of Wu-mang tao. The summit of the island, 1,267 feet (386^m2) high, is situated near the southern extremity, and Hsüan-lou (Genrō), a bluff 372 feet 15 (113^m4) high, is situated on its north-western side.

Pei t'o-tzu (Hoku dashi), 523 feet (159^m4) high, lies close off the northern coast of Hai-yang tao and is only separated from it at high water. Mu-chi t'ou (Mukuki tō), 80 feet (24^m4) high, lies about one mile south-westward of Yin-wo (Ginwa), the north-western extremity 20 of Pei t'o-tzu. Yen-tzu shan (Ganshi san), 119 feet (36^m3) high, lies about 1½ miles eastward of the northern point of Pei t'o-tzu, and a natural tunnel runs through it from east to west. The passage between Yen-tzu shan and Pei t'o-tzu is deep and clear, except for a rocky patch, with a depth of 41 feet (12^m5) over it, lying about one 25 mile north-westward of the former.

Nan t'o-tzu (dashi) lies about one mile east-south-eastward of Ch'ang tsui-tzu (Chōsuishi), a point situated about 2 miles north-eastward of P'ien-yü t'ou (Hengyō tō), the southern extremity of Hai-yang tao. Nan t'o-tzu consists of two parts connected by a 30 reef; it has three hills, two on the eastern part and one on the western part, the latter, 323 feet (98^m4) high, being the highest. A rock, which dries 11 feet (3^m3), and on which the sea breaks, lies about 1½ cables southward of the western part of the island. The channel between Nan t'o-tzu and Hai-yang tao is deep and clear. 35

Hsi-nan chiao (Seinan shō), a rock with a least depth of 5 feet (1^m5) over it, lies about 2 miles west-north-westward of P'ien-yü t'ou.

Light.—A light is exhibited, at an elevation of 154 feet (46^m9), from a white circular concrete tower, 25 feet (7^m6) in height, situated on the point about half a mile northward of Hsüan-lou (*Lat.* 39° 40 05' N., *Long.* 123° 08' E.).

Anchorage.—Hai-yang-tao (Kaiyōtō) wan, situated on the western coast of Hai-yang tao, is entered between Hsüan-lou and a point lying about half a mile south-eastward, from which a reef, with a rock 37 feet (11^m3) high on it, extends about half a cable 45 northward.

There are depths of from 6 to 20 fathoms (11^m0 to 36^m6) in the entrance, and thence the depths shoal gradually towards the head of the bay, which dries out for a quarter of a mile. There are several small villages along the shores of the bay. 50

Small vessels with local knowledge can anchor in Hai-yang-tao wan, in depths of from 3½ to 4 fathoms (6^m4 to 7^m3), sheltered from all winds, but they will probably feel the swell that runs in with a strong westerly wind.

Charts 1256, 1262, 2347.

Chart 3388.

Local magnetic anomalies.—Local magnetic anomalies have been reported in the vicinity of Hai-yang tao.

Wei-ch'ang-shan lieh-tao.—**Dangers.**—**Anchorage.**—Wei-ch'ang-shan lieh-tao (Blonde group) consists of five islands, all of much the same character, having ranges of hills with deep valleys or ravines between, and bordered by cliffy coasts. Hsiao-hao tao (Shōkō tō), the easternmost island of the group, lies about 12 miles westward of Hai-yang tao and is 428 feet (130^m4) high; Ya-hou-chū chia (Okakushō kō), the north-western extremity of this island, is a narrow peninsula which rises to an elevation of 207 feet (63^m1), and its north-eastern extremity is a steep bluff. Ma-erh shih (Baji seki), a rock, 67 feet (20^m4) high, lies close off the south-eastern point, and a rock, which dries 10 feet (3^m0), lies nearly 2 cables off the south-western point. Ya-pa t'o-tzu (Ahatsu dashi), 134 feet (40^m8) high, lies about 1½ miles southward of Hsiao-hao tao.

Ta-hao tao (Daikō tō), 500 feet (152^m4) high, lies west-south-westward of Hsiao-hao tao, from which it is separated by Hao-tao shui-tao (Kōtō suidō), a deep channel about one mile wide; Ta-wa chia (Daiwa kō) is its northern extremity. A rock, 182 feet (55^m5) high, lies on the extremity of a reef, which partly dries, extending about 4 cables southward from the southern point of Ta-hao tao; another rock, 100 feet (30^m5) high, lies close northward of the first mentioned rock.

Ta-lien tao (Tōren to) consists of two islands connected by a reef. Tung-ta-lien tao (Tōtōren tō), the eastern island, is 320 feet (97^m6) high, and lies north-westward of Ta-hao tao, from which it is separated by a deep channel about three-quarters of a mile wide. Hsi-ta-lien tao (Seitōren tō), the western island, situated close westward of Tung-ta-lien tao, is 271 feet (82^m6) high; a rock, which dries 10 feet (3^m0), lies off its south-western side.

Chang-tzu tao (Shōshi tō), the westernmost and largest island of the group, lies south-westward of Ta-lien tao and Ta-hao tao (*Lat.* 39° 03' N., *Long.* 122° 49' E.), from which it is separated by Chang-tzu shui-tao (Shōshi suidō), a deep channel about 3 miles wide. Two ranges of hills, with a ravine between them, rise in the middle of the island; the western of these is 484 feet (147^m5) high, and the eastern is 494 feet (150^m6) high. Foul ground extends for about a quarter of a mile from the northern extremity of the island. There are two bays on the north-eastern side of Chang-tzu tao and the north-western of these affords anchorage to vessels with local knowledge, sheltered from southerly and south-westerly winds, in depths of from 7 to 11 fathoms (12^m8 to 20^m1). A rock, 54 feet (16^m5) high, lies close off the eastern entrance point of the north-western bay, and another, which dries 5 feet (1^m5), lies about 2 cables northward of the same point. A rock, 57 feet (17^m4) high, lies close off the eastern entrance point of the south-eastern bay. Ying-tsui-yu (Yōsui seki) is the south-eastern extremity of Chang-tzu tao. Lao-wa-la (Rōwarō) is the extremity of a peninsula on the south-western side of Chang-tzu tao, which projects nearly half a mile westward from a position about 2 miles west-north-westward of Ying-tsui-yu. A rock, 87 feet (26^m5) high, lies close inshore about three-quarters of a mile south-eastward of Lao-wa-la. There is also anchorage, sheltered from easterly winds, in the bay between Lao-wa-la and the north-western

Charts 1256, 1262, 2347.

Chart 3388.

extremity of Chang-tzu tao, in depths of from 7 to 11 fathoms (12^m8 to 20^m1).

Chart 1256.

Out-lying rock.—Ta-mu-ting (Shisiau) lies about 4½ miles south-ward of the southern extremity of Chang-tzu tao, and is a rock 36 feet (11^m0) high, standing on a flat, rocky ledge which extends about 2 cables all round; rocks, which dry, extend for about a quarter of a mile southward of this ledge. Ta-mu-ting (*Lat.* 38° 56' N., *Long.* 122° 45' E.) appears at a distance like a junk under sail. 10

Chart 3388.

Li-ch'ang-shan lieh-tao.—**General remarks.**—Li-ch'ang-shan lieh-tao (Elliot group) lies north-westward of Wei-ch'ang-shan lieh-tao and is separated from it by Wei-ch'ang-shan shui-tao (Gaichōsan suidō), which is deep, free from dangers, and about 8 miles wide. 15 Li-ch'ang-shan lieh-tao consists of nine principal islands and numerous islets and rocks; it is one of the most important fishing centres in Yellow sea.

A large area on the southern side of the central part of the group, and also the fairways of all the principal channels between the 20 islands, have been examined by sweeping.

Pa-hsiao tao and Hsiao-ch'ang-shan tao.—**Islets and dangers.**—Pa-hsiao tao (Hashō tō), the eastern islet of Li-ch'ang-shan lieh-tao, is situated about 8½ miles northward of Ta-lien tao. Its summit, 506 feet (154^m2) high, is situated in the southern part of the island. 25 Lo-ch'üan chiao (Raken kaku), the eastern extremity of Pa-hsiao tao, is 394 feet (120^m1) high and terminates in a cliff. Yin-tzu shih (Ginshi seki), a rock 83 feet (25^m3) high, surrounded by a reef, lies about 4 cables south-south-westward of the south-eastern point of the island, and Shih-tzu shih (Shishi seki), 24 feet (7^m3) high, lies close off its south-western side. A rock, with a depth of one foot (0^m3) over it, lies nearly a quarter of a mile off the eastern part of the northern coast, and a rock, awash, lies about a quarter of a mile off the western part of this coast. 30

The strait between the western extremity of Pa-hsiao tao and the 35 eastern extremity of Hsiao-ch'ang-shan tao (Shōchōsan tō), situated about three-quarters of a mile westward, is greatly obstructed by islets and rocks. San t'o-tzu (dashi), 207 feet (63^m1) high, Erh t'o-tzu (Ni dashi), 148 feet (45^m1) high, and Ta t'o-tzu (Dai dashi), 204 feet (62^m2) high, lie on the southern side of the strait; Sha-chu t'o-tzu 40 (Sashū dashi), 194 feet (59^m1) high, and Po-lo t'o-tzu (Hara dashi), 171 feet (52^m1) high, which are connected to each other and also to the eastern extremity of Hsiao-ch'ang-shan tao by reefs, lie on the northern side of the strait. Hui-ts'ai t'o-tzu (Kaisai dashi), 129 feet (39^m3) high, lies nearly three-quarters of a mile north-north- 45 eastward of Po-lo t'o-tzu; a rock, which dries one foot (0^m3), lies nearly half a mile south-westward of Hui-ts'ai t'o-tzu.

Hsiao-ch'ang-shan tao is hilly along its south-eastern side, and rises to a maximum elevation of 486 feet (148^m1) in about the middle of the south-eastern coast; the remainder of the island is much 50 lower. Yang-t'o-tzu chien (Yōdashi sen) is the southern extremity of an islet connected to the southern point of Hsiao-ch'ang-shan tao by a rocky ridge; a rock, which dries 4 feet (1^m2), lies about 2 cables north-eastward of Yang-t'o-tzu chien. Wang-jen Chiang (Bōjin kō),

Charts 1256, 1262, 2347.

Chart 3388.

a bay on the southern side of Hsiao-ch'ang-shan tao, is entered between Yang-t'o-tzu chien and a point lying about $2\frac{1}{2}$ miles north-westward; the north-eastern corner of the bay dries out about 3 cables. T'iao-yü-t'ai (Chōgyodai), a rock which dries 12 feet (3^m7), lies close inshore about 7 cables northward of Yang-t'o-tzu chien. Ch'ing-kan-tzu (Seikanshi), a rock lying nearly 2 miles north-westward of Yang-t'o-tzu chien, is 79 feet (24^m1) high, and Erh-kai-tzu, a rock which dries 5 feet (1^m5), lies about $1\frac{1}{2}$ cables westward of it, with foul ground between; a 10-foot (3^m0) patch lies about three-quarters of a mile south-eastward of Ch'ing-kan-tzu. A rock, with a depth of less than 6 feet (1^m8) over it, lies near the head of the bay and nearly $1\frac{1}{2}$ miles east-north-eastward of Ch'ing-kan-tzu. Han t'o-tzu, 47 feet (14^m3) high, lies close inshore about one mile north-eastward of Ch'ing-kan-tzu. Hsiao t'o-tzu, 43 feet (13^m1) high, lies close inshore about one mile westward of Han t'o-tzu. A similar rock, 73 feet (22^m3) high, lies about one mile westward of Hsiao t'o-tzu. Hsiao-ha-mang chiao, 2 feet (0^m6) high, lies about $1\frac{1}{2}$ cables offshore off the western extremity of Hsiao-ch'ang-shan tao.

The northern coast of Hsiao-ch'ang-shan tao is mostly fringed by reefs and shoals, which extend as much as a quarter of a mile offshore. Lo-t'ou-tzu shih (Rōtōshi seki), 66 feet (20^m1) high, lies close inshore nearly half a mile southward of the north-eastern point of the island. Two islets and some rocks lie on a reef which extends about 6 cables northward from a point situated about half a mile westward of the north-eastern point of the island (*Lat.* 39° 15' N, *Long.* 122° 43' E.); Ta t'o-tzu (Dai dashi), the outer islet, is 129 feet (39^m3) high, and Erh t'o-tzu, the inner islet, is 102 feet (31^m1) high. Ka-mang chiao (Gobō shō) a rock, which dries 13 feet (4^m0), lies about a quarter of a mile eastward of Ta t'o-tzu, with a rock awash, named Lao-han-chiang, between. A rock, 24 feet (7^m3) high, lies close inshore about half a mile westward of Erh t'o-tzu, and another, 2 feet (0^m6) high, lies $1\frac{1}{2}$ cables offshore about 2 miles further westward. A rock, 37 feet (11^m3) high, and another which dries 2 feet, lie near the western end of the northern coast of the island.

Sai-li shui-tao and Sai-li tao.—Islets and dangers.—Directions.—Sai-li shui-tao (Sairi suidō), situated between the western extremity of Hsiao-ch'ang-shan tao and the eastern side of Sai-li tao (Sairi tō), lying about one mile south-westward, has depths of from 6 to 9 fathoms (11^m0 to 18^m3) in the fairway, but there are several dangers in it. Ta-ha-mang chiao (Daigōbō shō), 25 feet (7^m6) high, lies in the middle of the southern part of the strait and about $1\frac{1}{2}$ miles westward of Ch'ing-kan-tzu; a rock, with a depth of $3\frac{1}{4}$ fathoms (5^m9) over it, lies about 2 cables north-eastward of Ta-ha-mang chiao, and about one cable further north-eastward is a rock with a depth of less than 6 feet (1^m8) over it. Foul ground extends into the middle of the strait from the eastern side of Sai-li tao, with Hu-tzu-chiang, a group of rocks which dry 7 feet (2^m1), at its outer end, and Hsing shih, a similar group, about one cable off shore. A shoal of some extent, with a least depth of 4 fathoms (7^m3) over it, lies on the western side of the northern entrance to Sai-li shui-tao. A vessel proceeding through Sai-li shui-tao should pass westward of Ta-ha-mang chiao.

Sai-li tao has several hills on it, the highest, 316 feet (96^m3) high,

Charts 1256, 1262, 2347.

Chart 3388.

being situated in about the middle of the south-eastern side of the island. Three islets lie close off the north-western coast, and Sha-t'un-ch'uang (Satsuton shō), a rock which dries 8 feet (2^m4), lies about 3 cables off the middle of this coast. Ta t'o-tzu (Dai dashi), 247 feet (75^m3) high, lies about a quarter of a mile off the southern extremity of Sai-li tao and is connected to it by a reef. Hsiao t'o-tzu (Shō dashi), 151 feet (46^m0) high, lies close eastward of the southern extremity of Sai-litao.

Ha-hsien shui-tao and Ha-hsien tao.—Islets and dangers.—Ha-hsien tao (Gōsen tō) lies with its eastern end about 2½ miles west-north-westward of Sai-li tao, and is separated from that island by Ha-hsien shui-tao (Gōsen suidō), which is deep and free from dangers, except for the rock lying about 3 cables off the north-western coast of Sai-li tao. The summit of Ha-hsien tao, 352 feet (107^m3) high, is situated near the western extremity. Ta-chiang (Daikō), which dries 10 feet (3^m0), lies close off the north-eastern corner of Ha-hsien tao. Wu-hu shih (Goko seki) consists of several rocks, the highest being 89 feet (27^m1) high, lying on a reef which extends about 3 cables south-westward from the south-western point of Ha-hsien tao (*Lat.* 39° 13' N., *Long.* 122° 30' E.); a detached rock, which dries 5 feet (1^m5), lies close off the extremity of this reef, and a 4-fathom (7^m3) patch lies about 4 cables westward of the same point. Hai-kou chiao (Kaiku shō), 4 feet (1^m2) high, lies on foul ground which extends about a quarter of a mile from the western extremity of Ha-hsien tao, and an isolated 10-foot (3^m0) patch lies about 4 cables west-north-westward of the same position. The northern coast is sandy, and is fringed by reefs which extend fully three-quarters of a mile from the western part, and terminate north-westward in some islets, including Hsi-chung-ku-lou (Seishōkorō), an islet 217 feet (66^m1) high; Tung-chung-ku-lou (Toshōkorō), situated about 1½ miles north-westward of Ta-chiang, is connected to the coast by a sandy spit.

Ta-ch'ang-shan tao.—Ch'ang-shan-tung shui-tao.—Ssu-k'uai-shih po-ti.—Islets and dangers.—Beacons.—Ta-ch'ang-shan tao (Dai-chōsan tō), the northernmost island of Li-ch'ang-shan lieh-tao, lies with its western extremity about 3 miles northward of Hsi-chung-ku-lou; its eastern part is separated from the northern side of Hsiao-ch'ang-shan tao by Ch'ang-shan-tung shui-tao (Chōsantō suidō), which has depths of from 7 to 11 fathoms (12^m8 to 20^m1) in the fairway. Chih-feng tsui, the eastern point of the island, lies about 3½ miles north-eastward of the western end of Hsiao-ch'ang-shan tao; Lao-hu wei (Rōkobi), its northern extremity, is 50 feet (15^m2) high. Ts'ao t'o-tzu (Sō dashi), 30 feet (9^m1) high, lies on a reef which extends about 2 cables from Chih-feng tsui, and a rock, with a depth of 13 feet (4^m0) over it, lies about half a mile eastward of the same point. Chiao-li tao (Kyōri tō), 60 feet (18^m3) high, lies nearly 1½ miles eastward of Chih-feng tsui.

Ta-kou-nao (Daikunō), a point on the southern coast of Ta-ch'ang-shan tao, is situated about 1½ miles south-westward of Chih-feng tsui. Nearly 1½ miles westward of Ta-kou-nao is the extremity of a rocky ledge which extends about 6 cables from the southern coast of Ta-ch'ang-shan tao; there are shoal depths between Ta-kou-nao and this ledge, at the southern end of which lies Ta-chiao t'ou

Chart 3388.

(Daishō tō), which dries 9 feet (2^m7). Ta-yin-wo shih (Daiginwa seki,) 47 feet (14^m3) high, is situated about 2 miles westward of Ta-kou-nao, and on the outer part of a rocky ledge which extends
 5 about 3 cables from the coast ; a shoal, with a depth of 3 fathoms (5^m5) over it, lies about 6 cables south-westward of Ta-yin-wo shih, with a 17-foot (5^m2) patch between. Chieh-pa t'o-tzu (Kaiha dashi), 224 feet (68^m3) high, lies about a quarter of a mile off the southern extremity of a peninsula which extends about one mile from the
 10 middle of the southern coast of Ta-ch'ang-shan tao ; there is no passage between this rock and the peninsula. A monument, 28 feet (8^m5) in height, stands on a hill on the western side of this peninsula. Shuang-shih-chiang (Sōseki kō), a rock which dries 9 feet (2^m7), lies about half a mile north-eastward of Chieh-pa t'o-tzu, and is marked
 15 by a white beacon consisting of an iron pillar, with a spherical cage topmark, on a hexagonal concrete base, 28 feet (8^m5) in height. Huang-shih-chiang (Kōseki kō), a rock which dries 10 feet (3^m0), lies about 3 cables northward of Shuang-shih-chiang and is marked by a white wooden post, 16 feet (4^m9) in height ; Hung-shih chiao,
 20 a group of rocks, with a depth of less than 6 feet (1^m8) over them, lies about one cable south-eastward of this rock. Ssu-k'uai shih, a rock 18 feet (5^m5) high, lies close off a point situated about 2 cables north-westward of Huang-shih-chiang. A rock, which dries 12 feet (3^m7), lies about 3 cables north-westward of the monument on the
 25 peninsula, and about 1½ cables offshore ; the southern coast of Ta-ch'ang-shan tao westward of the peninsula is fairly steep-to.

The northern coast of Ta-ch'ang-shan tao consists to a great extent of bare, precipitous cliffs, fringed in places by reefs, of which some extend nearly 2 cables offshore. Ta-huang chiao (Daikō shō), a
 30 flat rock 16 feet (4^m9) high, lies nearly one mile north-westward of the eastern point of the island ; a shoal, with a depth of 14 feet (4^m3) over it, extends about one cable from the southern side of this rock. Chien-chien shan (Sensen san), 322 feet (98^m1) high, is situated on the coast about 1½ miles westward of Ta-huang chiao, and, with Chieh-pa
 35 t'o-tzu (*Lat.* 39° 15' N., *Long.* 122° 35' E.) and the monument on the peninsula, is a useful mark for vessels proceeding through Ha-hsien shui-tao ; from this direction it appears as a sharp peak. Kao-li-ch'eng (Kōreijō) is a point lying about 6 cables west-north-westward of Chien-chien shan. Lao-mu-chu chiao (Rōbocho shō) a rock which
 40 dries 13 feet (4^m0), lies about 7 cables westward of Kao-li-ch'eng and about 6 cables offshore. Yu-tzu chiao, one foot (0^m3) high, lies close inshore about 6 cables south-westward of Lao-mu-chu chiao. Ta-she t'o-tzu (Daija dashi), 194 feet (59^m1) high, lies about 3¾ miles west-north-westward of Chien-chien shan and 2 cables offshore ; it
 45 is connected to the coast by a sand spit. Mien-yang shih (Kinjō seki), a rock which dries 5 feet (1^m5), lies about 8 cables eastward of Ta-she t'o-tzu, and about half a cable northward of this rock is a rock which dries 2 feet (0^m6). Tang-li-kou (Tōrikō) wan, a shallow indentation, penetrates the coast for a distance of about one mile
 50 immediately westward of Ta-she t'o-tzu, and there is another smaller bay about one mile further westward. Lao-ting-wo (Rōteiwa) is the northern extremity of the peninsula separating these two bays. Yüan-yang t'o-tzu (Enō dashi), an islet 73 feet (22^m2) high, with an islet or rock close off its eastern side, lies about 6 cables north-

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Chart 3388.

eastward of the western point of Ta-ch'ang-shan tao and 3 cables offshore ; a reef, with a depth of 14 feet (4^m3) over it, extends about one cable south-westward from this islet. A rock 40 feet (12^m2) high, lies close north-eastward of the western extremity of Ta-ch'ang-shan tao. 5

Off the southern side of Ta-ch'ang-shan tao is Ssu-k'uai-shih po-ti (Seikaiseki hakuchi), a roadstead bounded northward by Chieh-pa t'o-tzu and the rocks lying north-eastward of it, southward by Sai-li tao, and eastward by Hsiao-ch'ang-shan tao ; it affords anchorage in depths of from 5 to 12 fathoms (9^m1 to 21^m9). Vessels call here regularly to load salt. 10

Ko-hsien tao and Ch'ang-shan-hsi shui-tao.—Islets and dangers. Ko-hsien tao (Kakusen tō) lies about 3 miles south-westward of the western end of Ta-ch'ang-shan tao, and its coasts are mostly rocky 15 and precipitous ; the summit of the island, 218 feet (66^m4) high, is situated in the south-eastern part. Ta t'o-tzu, 119 feet (36^m3) high, and Hsiao t'o-tzu, 129 feet (39^m3) high, are situated on a reef which extends about a quarter of a mile eastward from the eastern point of Ko-hsien tao, and T'ieh-men-k'an (Tetsumonkan), a rock which 20 dries 11 feet (3^m4), lies about half a mile east-south-eastward of the same point. The depths within three-quarters of a mile of the north-eastern side of Ko-hsien tao are very irregular, with depths of from 17 to 24 feet (5^m2 to 7^m3) in places. Foul ground extends as much as half a mile around the western extremity of the island (*Lat.* 39° 25 16' N., *Long.* 122° 25' E.). 25

Ch'ang-shan-hsi shui-tao (Chōsansei suidō) is bounded northward by the western part of the southern coast of Ta-ch'ang-shan tao, and southward by Ko-hsien tao and Ha-hsien tao. The northern side of the strait is deep and clear, but a narrow shoal, with depths of 30 from 22 to 33 feet (6^m7 to 10^m1) over it, extends about 2 miles south-eastward from a position about 1½ miles southward of the western point of Ta-ch'ang-shan tao.

Kua-p'i tao.—Kua-p'i shui-tao.—Ko-hsien shui-tao.—Islets and dangers.—Kua-p'i tao (Kahi tō) lies about 1½ miles southward of 35 Ko-hsien tao ; its summit, situated in the middle of the island, is 267 feet (81^m7) high. A shoal, with depths of less than 3 fathoms (5^m5) over it, extends nearly half a mile north-westward from the northern extremity of Kua-p'i tao. Ta-ts'ao t'o-tzu (Daisō dashi), 132 feet (40^m2) high, lies about 6 cables south-eastward of the 40 eastern extremity of Kua-p'i tao, with Hsiao-ts'ao t'o-tzu (Shōsō dashi), 76 feet (23^m2) high, between ; there is foul ground around these islets, and Hai-kou chiao (Kaiku shō), a rock 8 feet (2^m4) high, lies about 4 cables south-eastward of Ta-ts'ao t'o-tzu.

Kua-p'i shui-tao (Kahi suidō), bounded eastward by Ha-hsien tao 45 and westward by Kua-p'i tao and Ko-hsien tao is deep in the fairway, but care must be taken to avoid the rocks on either side of the channel. A rock, with a depth of 8 feet (2^m4), over it, lies in the middle of the northern entrance of this strait and about 9 cables west-north-westward of Hsi-chung-ku-lou (page 679). 50

Ko-hsien shui-tao (Kakusen suidō), situated between Kua-p'i tao and Ko-hsien tao, has irregular depths ; a shoal, with a least depth of 17 feet (5^m2) over it, lies in the middle of the western entrance, and a shoal, with a least depth of 21 feet (6^m4) over it, lies in the northern

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Chart 3388.

half of the eastern entrance ; midway between these there is a 34-foot (10^m4) patch.

Kuang-lu tao.—Islets and dangers.—Kuang-lu tao (Kōroku tō), the westernmost island of Li-ch'ang-shan lieh-tao, lies with its north-eastern point nearly three-quarters of a mile south-westward of Kua-p'i tao, and is connected to it by reefs ; its south-western part is high, rising to an elevation of 821 feet (250^m2), whilst the remainder of the island is comparatively low and undulating. The north-eastern extremity is a peninsula 155 feet (47^m2) high, connected to the main island by a narrow spit ; a shoal, with general depths of less than 3 fathoms (5^m5) over it, extends up to about 1½ miles northward from the northern side of this peninsula and the north-western side of Kua-p'i tao. Yüan-pao t'o-tzu (Genhō dashi) consists of four rocks surrounded by a reef which extends about half a mile southward of them ; the eastern and highest rock is 76 feet (23^m2) high, and lies nearly 2 miles north-westward of the peninsula which forms the north-eastern extremity of Kuang-lu tao. A rock, with a depth of 7 feet (2^m1) over it, lies about half a mile north-eastward of the 76-foot (23^m2) high rock.

Miao-tung (Byōtō) wan is entered between the 155 feet (47^m2) high peninsula and Hung-tzu-tung (Kōshi tō), an island, 198 feet (60^m3) high, lying nearly 2 miles southward, which is connected to the eastern coast of Kuang-lu tao by a sand spit ; Kuang-lu shan (Kōroku san), 355 feet (108^m1) high, lies close off the eastern extremity of Hung-tzu-tung and is connected to it by a sand spit. Shih t'o-tzu (Seki dashi) (*Lat.* 39° 12' N., *Long.* 122° 25' E.), a rock 40 feet (12^m2) high, with foul ground extending about one cable around, lies in the middle of the entrance to Miao-tung wan, and about three-quarters of a mile northward of this rock is Pan-la t'o-tzu (Hanrō dashi), a rock 60 feet (18^m3) high. Two 52-foot (15^m8) patches lie in the approach to Miao-tung wan, about 2 miles eastward of Shih t'o-tzu.

Liu-t'iao-kou (Ryūjōkō) wan, situated on the south-eastern coast of Kuang-lu tao, is separated from Miao-tung wan by a peninsula of which Ta-yü-pi-kou tsui (Daigyohikō sui) is the south-eastern extremity. This bay has depths of from 6 to 9 fathoms (11^m0 to 16^m5) in the entrance, decreasing gradually towards the head, except for a rock, with a depth of 3 fathoms (5^m5) over it, lying almost in the middle of the bay. Ha-ma chiao, a rock which dries 13 feet (4^m0), lies about 1½ cables north-eastward of the western entrance point. A prominent white monument, 20 feet (6^m1) in height, stands on Lao-wang shan, a promontory, 210 feet (64^m0) high, which projects about a quarter of a mile from the eastern shore of the bay. Liu-t'iao-kou wan is exposed to southerly winds, but it affords the only landing place on the island.

Lu-chüan-tzu (Rokuken shi), the southern extremity of Kuang-lu tao rises steeply to Lao-t'ieh shan (Rōtetsu san), a conical peak 811 feet (247^m2) high. Chiang-chün shih, a rock, 116 feet (35^m3) high, lies close offshore and about 1½ cables eastward of Lu-chüan-tzu ; a rock, 9 feet (2^m7) high, lies about 2 cables east-north-eastward of this rock. Fan t'o-tzu (Hen dashi), 244 feet (74^m4) high, lies about 1½ miles west-north-westward of Lu-chüan-tzu and nearly three-quarters of a mile offshore ; Ho-yü-kuei (Haōkai), 132 feet (40^m2) high, lies about 2 cables westward of Fan t'o-tzu and is connected

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Chart 3388.

to it by a reef. Pao-yü-tu-tzu (Hogyotoshi) is nearly 2 miles north-north-westward of Lu-chüan-tzu, and Sha-chien-tzu tsui (Sasenshi kō) is about three-quarters of a mile northward of Pao-yü-tu-tzu, the coast between being fringed by reefs and shoals to a distance of 5 about half a mile offshore. Hu-lu tao (Koro tō) is situated nearly one mile north-westward of Sha-chien-tzu tsui, and is connected to it by a sand spit. Pei hai (Hoku kai), on the northern side of Sha-chien-tzu tsui, is entered between Hu-lu tao and a point on the main island about $1\frac{1}{4}$ miles eastward; it has depths of about 5 fathoms 10 (9^m1) in the entrance, decreasing gradually towards the head. Mien-yang shih (Menyō seki), 13 feet (4^m0) high, lies about 6 cables north-eastward of Hu-lu tao; Shuang-chiao-tzu (Sōshoshi), a rock which dries 6 feet (1^m8), with another rock close south-westward of it, lies nearly one mile north-eastward of Mien-yang shih. These rocks 15 are surrounded by shoals with depths of less than 3 fathoms (5^m5) over them, and a similar shoal lies between Shuang-chiao-tzu and Yüan-pao t'o-tzu (page 682).

Light.—A light is exhibited, at an elevation of 233 feet (71^m0), from a white circular concrete structure, 26 feet (7^m9) in height, on the 20 western summit of Hu-lu tao (*Lat.* $39^\circ 12' N.$, *Long.* $122^\circ 18' E.$).

Tidal streams.—In the vicinity of Li-ch'ang-shan lieh-tao, the east-going or north-going stream flows for a period from 4 to 5 hours after high water to a similar interval after low water: at other times, the west-going or south-going stream is experienced. 25

Li-ch'ang-shan shui-tao.—Li-ch'ang-shan shui-tao (Richōsan suidō) is bounded north-westward by the coastal bank which extends from the coast of the mainland between the mouth of Pi-liu ho and Ch'eng-shan t'ou, and south-eastward by Li-ch'ang-shan lieh-tao. There are depths of over 7 fathoms in the fairway, but a shoal, with a least 30 depth of 5 fathoms (9^m1) over it, lies about 2 miles south-eastward of Hei tao (page 672); another shoal, with a least depth of 22 feet (6^m7), lies about $1\frac{1}{4}$ miles eastward of this island.

Chart 1798.

COAST.—Ch'eng-shan t'ou to Ta-lien wan.—General remarks.— 35 From Ch'eng-shan t'ou the coast trends south-westward for about 20 miles to the eastern entrance point to Ta-lien (Dairen) wan. This stretch of coast is deeply indented and generally hilly, and fairly steep-to, with few dangers more than one mile offshore. Some islands extend up to about 5 miles offshore in the approach to Ta-lien 40 wan.

Coast.—Dangers.—The coast between Ch'eng-shan t'ou (page 672) and Nan tsui (Minami point), situated about $4\frac{1}{4}$ miles south-westward, is rocky and broken, and rocks and shoals extend a quarter of a mile offshore in places. An islet, 29 feet (8^m8) high, lies close inshore 45 about one mile north-eastward of Nan tsui, and a stream flows into a cove situated between this islet and Nan tsui.

Ch'ang-chiang ao (Joko oki) is a shoal bay entered between Nan tsui (*Lat.* $39^\circ 07' N.$, *Long.* $122^\circ 05' E.$) and Ch'ang-chiang tsui (Chanjan ze), situated about 3 miles southward; Ch'ing-yün ho 50 (Seiun kawa) flows into the head of the bay, but its estuary dries. Ch'ang-chiang tsui is the extremity of a rocky peninsula, which rises to an elevation of 234 feet (71^m3) and extends south-eastward from

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Chart 1798.

the flat land at the head of Stream bay (*see* below), thereby separating that bay from Ch'ang-chiang ao. Foul ground, which dries in places, extends nearly three-quarters of a mile southward from Ch'ang-chiang tsui ; Ta chiao (Tajo), a rock 17 feet (5^m2) high, lies on the outer end of foul ground which extends about half a mile eastward from this point, and some rocks, which dry, lie within a distance of half a mile north-north-eastward of Ta chiao. A group of rocks, which dry 9 feet (2^m7), lie about three-quarters of a mile north-north-westward of Ta chiao and on a shoal which extends nearly half a mile from the south-western shore of Ch'ang-chiang ao. Rocks, 26 and 36 feet (7^m9 and 11^m0) high, respectively, are situated close inshore further north-westward. The bay is open south-eastward, and a swell from that direction always runs into it in summer, even in fine weather.

15 **Tidal streams.**—The tidal streams off Ta chiao run south-westward with the rising tide and north-eastward with the falling tide ; tide rips occur for about 1½ miles southward of Ch'ang-chiang tsui.

Coast.—Dangers.—Anchorage.—Stream bay is entered between Ch'ang-chiang tsui and Sha-yü tsui (Shagyo point), about 5 miles west-south-westward. Sha-yü tsui is a steep-to, wooded point ; T'ai shan is a sharp peak, 881 feet (268^m5) high, situated about 2 miles north-north-westward of this point. The shores of the bay are rocky, except at the head, where there is a sandy beach with flat land behind ; Kao-li-ch'eng-tzu (Koreijo) is a rocky islet, 79 feet (24^m1) high, close to the shore at the head of the bay. San-liang-ch'e (Sanryosha) is a group of yellowish rocks, 22 feet (6^m7) high, lying off the entrance to the bay and about 3 miles eastward of Sha-yü tsui ; foul ground extends about 1½ cables south-eastward and north-eastward of the group, and discoloured water is sometimes seen for about 6 cables south-westward and one mile north-eastward. A rock, which dries 3 feet (0^m9), lies nearly 1½ miles westward of Ch'ang-chiang tsui and about half a mile offshore. A rock, which dries 2 feet (0^m6), lies nearly one mile north-north-eastward of Sha-yü tsui and 4 cables off the western shore of the bay ; a rock, 32 feet (9^m8) high, and another, which dries 8 feet (2^m4), are situated close inshore about midway between this rock and Kao-li-ch'eng-tzu.

Hsiao-yao wan (Shoyo ko) is entered between Sha-yü tsui and Hsiao-ch'uan tsui-tzu (Kuro saki), situated about 2 miles west-south-westward ; a large area at the head of the bay dries. Hsiao-ch'uan tsui-tzu is bordered by a shoal to a distance of a quarter of a mile. Sha-chien tsui (Shasen point) lies on the southern isle of the bay about 3 miles within the entrance.

Ta-yao wan (Taiyo ko) is entered between Hsiao-ch'uan tsui-tzu and Hooper point, situated about 3 miles south-south-westward, and the bay in the middle of its northern side is named Hsi-yao k'ou (Saiyo ko). Hooper point is the south-eastern extremity of Ta-ku-shan pan-tao, which separates Ta-yao wan from Ta-lien (Dairen) wan ; foul ground, on which is Sha to-tzu (da), 16 feet (4^m9) high, extends about 6 cables eastward from Hooper point (*Lat.* 38° 58' N., 50 *Long.* 121° 54' E.). Liu-li t'o-tzu (Ruri da), 52 feet (15^m8) high, is situated about 1½ miles northward of Hooper point and 4 cables off the western shore of the bay. Ch'ang tsui (Naga saki) is a point situated about 2½ miles north-westward of Liu-li t'o-tzu. Ta-yao wan affords good anchorage in depths of from 3 to 5 fathoms (5^m5 to

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Chart 1798.

9^m1), but it is open south-eastward, and a swell runs in from that direction in summer.

Chart 3694.

The southern coast of Ta-ku-shan pan-tao, between Hooper point 5 and Shan-hsi t'ou (Sansai to), situated about 3½ miles westward, is fringed by rocks and reefs to a distance of from 2 to 3 cables in places. Lao-wo tsui (Rowa point) lies about one mile west-south-westward of Hooper point, and Chiu-ts'ai t'o-tzu (Kyubei dashi), 39 feet 10 (11^m9^m high, lies about one mile further in the same direction and close off the southern extremity of the peninsula. Heng-hu shan (Koko san), 626 feet (190^m8) high, is situated about one mile northward of Chiu-ts'ai t'o-tzu.

Light.—A light is exhibited, at an elevation of 57 feet (17^m4), from a white circular concrete tower on Chiu-ts'ai t'o-tzu. 15

Chart 1798.

Tidal streams.—About 2 miles south-eastward of Ta-ku-shan pan-tao the tidal streams run west-south-westward, with a maximum rate of about 2½ knots, during the rising tide, and north-eastward, with a maximum rate of about 2½ knots, during the falling tide. 20

Off-lying dangers.—**Light.**—Hsien chiaō (Ken sho) (*Lat.* 38° 58' N., *Long.* 121° 59' E.) is a reef lying about 3½ miles eastward of Hooper point, and its northern part is just above high water; there are depths of from 5 to 10 fathoms (9^m1 to 18^m3) for about half a mile north-westward and 1½ miles north-eastward of the reef. 25

A rocky shoal, with a depth of 3½ fathoms (5^m9) over it, the position of which is approximate, was reported, in 1945, about 2 miles northward of Hsien chiaō.

A light is exhibited, at an elevation of 33 feet (10^m1), from a red tower with a black band, surmounted by a cylinder, 36 feet (11^m0) 30 in height, situated on Hsien chiaō.

Chart 3694.

Approach to Ta-lien wan.—Islands and channels.—Coast.—Obstructions.—Nan-san-shan tao (South San-shan tau) is situated with its northern extremity about 3½ miles southward of Shan-hsi t'ou, 35 and is divided into two parts by a narrow neck of rocks and shingle; the southern part rises to an elevation of 523 feet (159^m4), and the northern part to 516 feet (157^m3). The island is fringed by a reef, which extends as much as one cable in places, and an islet, 66 feet (20^m1) high, lies about 1½ cables off its south-eastern coast; a 40 bank, with depths of less than 10 fathoms (18^m3) over it, extends about one mile from the eastern coast. San-shan ao (Sanzan oki), the bay on the western side of the narrow neck, has depths of from 4 to 5 fathoms (7^m3 to 9^m1).

Pei-san-shan tao (North San-shan tau), 427 feet (130^m1) high, lies 45 about one mile northward of Nan-san-shan tao and is separated from it by San-shan shui-tao (San-shan-tau channel), which is deep and clear. An unconfirmed report, received in 1948, stated that dangerous obstructions existed in this channel.

Nei shui-tao (Inner channel), situated between Pei-san-shan tao 50 and the southern side of Ta-ku-shan pan-tao, is deep and clear.

The main channel of approach to Ta-lien wan, lies between Nan-san-shan tao and the coast of the mainland about 5 miles westward. Nan-shan tsui, the western entrance point to this channel, is situated

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Chart 3694.

about 6 miles westward of the southern extremity of Nan-san-shan-tao. The coast between Nan-shan tsui and Huang-pai (Howampo tsui), situated about $2\frac{1}{2}$ miles north-north-eastward, is cliffy, except
 5 for a sandy beach in a bight about midway between these two points. Pang-ch'ui tao (Pantsui tau) lies about a quarter of a mile off this sandy beach, with foul ground between, and rises to an elevation of 166 feet (51^m0) at its western end, thence sloping down gradually to its eastern point, which is steep-to.

- 10 **Lights.—Fog signals.—Radiobeacon.**—A light is exhibited, at an elevation of 257 feet (78^m3), from a white circular stone tower, 42 feet (12^m8) in height, situated on the southern extremity of Nan-san-shan tao. A fog signal is sounded from the lighthouse. A radio-telephone is installed to give information to Ta-lien of the names and draughts of
 15 vessels on their way in.

A light is exhibited, at an elevation of 271 feet (82^m6), from a white square concrete structure, 36 feet (11^m0) in height, situated on Huang-pai tsui. A fog signal is sounded from the light-structure. There is a radio-beacon at the light-structure.

Chart 1798.

Outlying islet and dangers.—Lights.—Fog signals.—Radiobeacon.—Radio D.F. station.—Yüan tao (Round islet) is situated nearly 20 miles south-eastward of the southern extremity of Nan-san-shan tao, and has a rounded summit 196 feet (59^m8) high.

- 25 A light is exhibited, at an elevation of 219 feet (66^m7), from a white square concrete structure, 52 feet (15^m8) in height, situated on Yüan tao. A fog signal is sounded from the lighthouse. There is a radio-beacon. A radio-telephone is installed on the islet to give information to Ta-lien of the names and draughts of vessels proceeding to that
 30 port. There is a radio D.F. station on Yüan tao.

Chart 1256.

- Yü yen (Gu gan) (*Lat. 38° 33' N., Long. 121° 40' E.*), situated about 26 miles west-south-westward of Yüan tao, is divided into two parts, the eastern and larger of which is 10 feet (3^m0) high ;
 35 when seen from the northward or southward it appears like a group of small rocks. A $4\frac{1}{2}$ -fathom (8^m7) rocky shoal lies about one mile north-eastward of Yü yen.

- A light is exhibited, at an elevation of 59 feet (18^m0), from a circular concrete tower, 59 feet (18^m0) in height, painted red and
 40 black in horizontal bands, situated on the eastern part of Yü yen. A fog signal is sounded periodically from the lighthouse. This light was reported to be extinguished in 1951.

Charts 3694, 1798.

- TA-LIEN WAN.—General remarks.**—Ta-lien (Dairen) wan is
 45 entered between Shan-hsi t'ou and Huang-pai tsui, and its shores are indented by several smaller bays ; the whole of the western side is included in the limits of Ta-lien chiang (Dairen kō) (page 688). In summer there is very good anchorage in the north-eastern part of Ta-lien wan, under the lee of Ta-ku-shan pan-tao.

- 50 Any of the three approach channels just described, namely the main channel, San-shan shui-tao, and Nei shui-tao, can be used by vessels bound for Ta-lien wan ; the main channel, the widest of the three, can be navigated by day or night, as there are lights on Mao-

Charts 1256, 1262.

Charts 3694, 1798.

tzu tao (Rohan tau) (page 697), Nan-san-shan tao, and Huang-pai tsui. Ta-ho-shang (Lao-hu) shan, situated at the head of Ta-lien wan and about 12 miles northward of Huang-pai tsui, and Wai-t'ou (Aitō) shan, about $11\frac{1}{2}$ miles westward of Huang-pai tsui, are fairly prominent. See view on chart 1798. 5

Chart 3694.

North-eastern side of Ta-lien wan.—Dangers.—Anchorage.—

Ta-ku k'ou (Taaku kō), situated on the eastern side of Ta-lien wan, is entered between Shan-hsi t'ou and Breaker point, lying nearly one mile northward. A reef extends about half a cable from Shan-hsi t'ou; a reef, with some rocks which dry on it, extends about $1\frac{1}{2}$ cables from Breaker point, and there are numerous rocks along the northern shore of the bay. A point, 15 feet (4^m6) high, projects from the middle of the eastern shore, and there is a shrine at its inner end; a reef, with a rock which dries 6 feet (1^m8) at its outer end, extends about one cable from this point. The village of Ta-ku-shan (Taaku-shan) is situated southward of the shrine. 15

Small vessels can proceed into the bay with the shrine bearing 080°, which leads clear of the shoal, with a depth of $2\frac{3}{4}$ fathoms (5^m0) over its outer end, which extends a quarter of a mile from the northern shore; they can anchor when the western side of Pei-san-shan tao is in line with Shan-hsi t'ou, bearing about 180°, or just within that line as convenient. Ta-ku (Taaku) shan has a double summit, the eastern and higher peak, situated about 4 cables east-south-eastward of Shan-hsi t'ou, rising to an elevation of 464 feet (141^m4); it is a good landmark for vessels bound for Ta-ku k'ou. The best landing place is on the southern shore, where boats can be drawn up on the beach at low water; at high water landing can be effected near the middle of the village. Sheep, poultry, eggs and fish are obtainable, but the local oysters are unsafe. 20 25 30

The coast between Breaker point (*Lat. 38° 58' N., Long. 121° 49' E.*) and the eastern entrance point of Hung-t'u-tsui-tzu hai (Kodotaishi kai), lying about 4 miles north-north-westward, is fringed by a narrow reef almost throughout, but there are no dangers outside a distance of one cable offshore. Hsi tsui (North point) lies about half a mile north-westward of Breaker point. 35

Charts 3694, 1798.

Hung-t'u-tsui-tzu hai, situated in the north-eastern part of Ta-lien wan, is about $1\frac{1}{2}$ miles wide at its entrance, and penetrates the land for about $3\frac{1}{2}$ miles north-westward, but the head of the bay dries out for about $1\frac{1}{2}$ miles, and the greater part of the remainder has depths of less than 3 fathoms (5^m5); it affords good shelter, however, for small vessels. Chiang chia t'o-tzu (Kyokada) is a rock above water lying about one cable off the northern shore about half a mile inside the entrance. Tung tsui-tzu (Tō sui), the western entrance point, is the eastern extremity of Ho-shang (Hosan) tao, which separates Hung-t'u-tsui-tzu hai from Ho t'ao (Ka tō), the next bay westward; although called an island, Ho-shang tao is in reality a peninsula connected to the mainland by a low isthmus. The south-eastern side of Ho-shang tao is bordered by a reef which extends as much as one cable, and there are depths of less than 3 fathoms (5^m5) for from one to 2 cables offshore. 40 45 50

Chart 1256, 1262.

Chart 3694.

Light.—A light is exhibited, at an elevation of 40 feet (12^m2), from a mast, 27 feet (8^m2) in height, situated near the shrine at the head of Ta-ku k'ou (*Lat.* 38° 58' N., *Long.* 121° 50' E.).

5 **TA-LIEN CHIANG.**—**General remarks.**—Ta-lien chiang (Dairen kō), which comprises the whole of the western part of Ta-lien wan, is an excellent natural harbour with convenient depths, and has the great advantage of being in railway communion with Europe ; the harbour includes the whole of the area of Ta-lien wan which lies
10 westward of the line joining Huang-pai tsui and Tung tsui-tzu. Ta-lien chiang is divided into seven areas, which are described hereafter. The most important is Fou-t'ou (Futō) area, the artificial harbour off the town of Ta-lien. Fou-t'ou, Hei-tsui-tzu, and Kan-ching-tzu (Kanscishi) areas are known as the inner harbour.

15 **Ice.**—The ice season normally lasts from the early part of January to the beginning of March, and the hardest frosts usually occur in the first half of February. In very cold weather, ice floes may consolidate into a continuous sheet of ice over the whole of the outer harbour. The ice-breakers employed have no difficulty in breaking up the ice in
20 Fou-t'ou area, and vessels are always able to proceed alongside the moles.

Pilotage.—Pilotage is compulsory for foreign vessels and for Chinese vessels of 1,000 tons gross or more proceeding alongside or leaving any of the moles and piers, but not in other cases. A vessel
25 should proceed to, and anchor in the quarantine anchorage (*see* below) to await the arrival of the pilot.

Chart 1798.

Light.—A light for the use of aircraft is exhibited, at an elevation of 717 feet (218^m5), from an iron framework tower, 49 feet (14^m9)
30 in height, situated on the summit of Yü shan (Gyoku san), a peak situated about 3½ miles north-westward of the head of Ta-lien chiang.
Chart 3694.

Fang-po area.—**Anchorage.**—**Quarantine anchorage.**—**Mooring buoys.**—Fang-po or Anchorage area lies immediately westward of the
35 harbour limit of Ta-lien chiang ; it is bounded southward by the line of the northern breakwater in Fou-t'ou area (page 689) ; westward by a line drawn from the northern entrance of Fou-t'ou area to Nan t'o-tzu, a point situated about 2 miles north-north-eastward ; and northward by a line joining Nan t'o-tzu to the southern point
40 of Ho-shang tao. Fang-po area is the outer anchorage of Ta-lien chiang and is open to all vessels. The depths vary from 4 to 7 fathoms (7^m3 to 12^m8), soft mud ; the holding ground is not good, but with two anchors down vessels can lie anywhere without danger, except with winds from between south-south-east and east-north-east,
45 which cause a long swell. Large vessels can anchor, in a depth of about 5½ fathoms (10^m5), with Huang-pai tsui bearing 180°, and the summit of Pei-san-shan tao bearing 107°. Smaller vessels can anchor northward of the northern breakwater of Fou-t'ou area in a depth of about 4 fathoms (7^m3).

50 The quarantine anchorage is in the western part of Fang-po area ; its limits are indicated by pecked lines on the chart. The Quarantine station and leading lights are described on page 689.

Two pairs of mooring buoys lie about one mile and 1½ miles,

Charts 1256, 1262.

Chart 3694.

respectively, northward of Huang-pai tsui (*Lat.* $38^{\circ} 54' N.$, *Long.* $121^{\circ} 43' E.$).

Ssu-erh-kou area.—Coast.—Dangers.—Piers.—Camber.—Lights.—Prohibited anchorage.—Ssu-erh-kou (Jijiko) area lies southward of Fang-po area, between Fou-t'ou area and the western harbour limit. 5

The coast for about $1\frac{1}{2}$ miles north-westward of Huang-pai tsui is fringed by reefs, rocks, and shoals, which extend nearly 3 cables offshore; Po-lang-chiang shih (Torae seki), which dries 5 feet (1^m5), lies nearly one mile north-westward of Huang-pai tsui and $1\frac{1}{2}$ cables 10 offshore.

Ssu-erh-kou No. 2 pier extends about half a mile north-eastward from the reclaimed land about $1\frac{1}{2}$ miles north-westward of Huang-pai tsui; there is a camber, with depths of from 10 to 16 feet (3^m0 to 4^m9), on the eastern side of the inner part of this pier. 15

A light is exhibited, at an elevation of 52 feet (15^m9), from a circular concrete structure, 41 feet (12^m5) in height, situated on the head of Ssu-erh-kou No. 2 pier. The entrance to the camber is marked by a light on the head of each breakwater.

Ssu-erh-kou No. 1 pier, which extends about half a mile north-eastward from a position about 4 cables west-north-westward of the root of Ssu-erh-kou No. 2 pier, is reserved for vessels loading and unloading dangerous goods and bean oil; there are pipe lines laid on to the pier from the oil tanks standing on the high ground close southward of it. 20

A light is exhibited, at an elevation of 54 feet (16^m5), from a white concrete structure, 40 feet (12^m2) in height, situated on the head of Ssu-erh-kou No. 1 pier. 25

The camber of the Quarantine station is situated about 3 cables westward of Ssu-erh-kou No. 1 pier. The entrance to the camber is indicated by leading lights; the front light is exhibited, at an elevation of 23 feet (7^m0), from a white concrete column, 23 feet (7^m0) in height, on the eastern side of the entrance; the rear light is exhibited, at an elevation of 59 feet (18^m0), from a white iron column on a red brick building 65 feet (19^m8) in height, situated about $2\frac{1}{2}$ cables south-south-westward of the front light. These lights are in line bearing 198° , and they also indicate the eastern limit of the quarantine anchorage (page 688). 30 35

It was reported, in 1953, that dredging operations were in progress in this area. 40

Anchorage is prohibited in the passage through this area to Fou-t'ou area, between lines drawn 110° from the lighthouses situated, respectively, at the northern and southern sides of the eastern entrance to the latter area.

Fou-tiou area.—Breakwaters.—Piers.—Wharves.—Lights.—Fog signal.—Depths.—Dangers.—Buoys.—Cables.—Signal station.—Fou-t'ou or Takong (Futō) area, situated immediately westward of Ssu-erh-kou area, is enclosed by three breakwaters and has three entrances. The eastern entrance, between the head of the eastern breakwater and the eastern extremity of the northern breakwater, has depths of fully 5 fathoms (9^m1), and there are about the same depths in the approach channel, which runs in an approximate 290° direction; the eastern entrance is the one generally used by ocean-going vessels. The northern entrance lies between the western extremity of the 45 50

Chart 3694.

northern breakwater and the north-eastern extremity of the western breakwater. The western entrance lies between the south-western extremity of the western breakwater and a mole which extends north-eastward from the shore ; a breakwater extends south-eastward from the head of this mole, and the basin thus enclosed is reserved for harbour service vessels. The northern and western entrances are used by small vessels and junks, and they are usually closed by booms, to keep out drift ice, from early in December to the middle of March.

A light is exhibited, at an elevation of 34 feet (10^m4), from a circular stone tower with a white lantern, 36 feet (11^m0) in height, situated on the head of the eastern breakwater ; a fog signal is sounded from this light-structure. A light is exhibited, at an elevation of 34 feet (10^m4), from a circular stone tower with a red lantern, 36 feet (11^m0) in height, situated on the eastern extremity of the northern breakwater. Submerged boulders extend for a short distance from the head of the eastern breakwater, and their outer limit is marked by a white conical buoy.

A light is exhibited, at an elevation of 62 feet (18^m9), from a square iron structure, 62 feet (18^m9) in height, the upper portion of which is painted red, situated on the western extremity of the northern breakwater. A light is exhibited, at an elevation of 61 feet (18^m6), from a square iron structure 62 feet (18^m9) in height, the upper portion of which is painted red, situated on the north-eastern extremity of the western breakwater (*Lat. 38° 57' N., Long. 121° 38' E.*).

A light is exhibited, at an elevation of 26 feet (7^m9), from a circular concrete tower with a red lantern, 22 feet (6^m7) in height, situated on the south-western extremity of the western breakwater.

A light is exhibited, at an elevation of 26 feet (7^m9), from a circular concrete tower with a white lantern, 22 feet (6^m7) in height, situated on the head of the mole south-westward of the western breakwater.

A submarine power cable crosses the eastern entrance, and a submarine cable crosses the northern entrance. *See page 37.*

Four piers extend from the southern side of Fou-t'ou area ; No. 1 pier runs along the inner side of the eastern breakwater, and Nos. 2, 3, and 4 are parallel to it and further westward. Wharves A, B, and C are along the reclaimed land between the inner ends of these four piers. There are berths for at least twenty vessels of 10,000 tons alongside the piers and wharves.

Pin-t'ing (Hamucho) pier extends east-south-eastward from the reclaimed land in the western part of Fou-t'ou area, and encloses a small basin where vessels under repair can lie, and which contains two dry docks. A light is exhibited in the northern corner of this basin. A pier with three spurs on its eastern side extends north-north-eastward about one cable westward of the root of Pin-t'ing pier.

There are depths throughout the greater part of Fou-t'ou area of from 4 to 6 fathoms (7^m3 to 11^m0) ; the bottom, of soft mud, is not good holding ground. The south-western part of the area has depths of less than 3 fathoms (5^m5), and a rock, with a depth of 2½ fathoms (4^m1) over it, lies about 3½ cables northward of the head of Pin-t'ing pier. There are two red conical buoys moored about 2 cables southward of the northern entrance.

The Harbour Construction office is situated on the western side of

Chart 3694.

the basin enclosed by Pin-t'ing pier; the office for the general administration of the harbour is situated near the root of No. 2 pier, and is a large seven-storied building. There is a prominent signal tower, known as No. 1 signal station, on the north-western corner of No. 2 pier. 5

The most convenient landing places are at the root of No. 2 pier opposite the Harbour office, and in the north-western corner of the basin enclosed by Pin-t'ing pier.

Hsiang-lu-chiao and Hei-tsui-tzu areas. — Dangers. — Harbour 10 works.—Breakwaters.—Light.—Dredged channel.—Buoys.—Hsiang-lu-chiao (Roseiachō) area is the south-western part of Ta-lien Chiang and is the area immediately westward of Fou-t'ou area; it is bounded northward by the line drawn from the light-structure on the western end of the northern breakwater of Fou-t'ou area to Hung tsui, 15 situated nearly $2\frac{1}{2}$ miles west-north-westward, and includes Ma-chia t'ao (Baka tō) and the southern part of Ch'ou-shui t'ao (Chosui tō). Hei-tsui-tzu (Kokusui shi) is a point situated about 3 cables south-westward of the western entrance to Fou-t'ou area. Tung-hai t'ou lies about $1\frac{1}{4}$ miles west-north-westward of Hei-tsui-tzu, and is the 20 extremity of a peninsula which forms the north-western side of Ma-chia t'ao. Hsiang-lu chiao (Kōro shō) (*Lat. 38° 57' N., Long. 121° 36' E.*), a rock 29 feet (8^m8) high, is situated on a reef which extends about 4 cables north-eastward from Tung-hai t'ou; a rock 10 feet (3^m0) high, lies about half a cable northward of Hsiang-lu chiao. A rock, 25 with a depth of $1\frac{1}{4}$ fathoms (2^m3) over it, lies about three-quarters of a mile east-north-eastward of Hsiang-lu chiao. Ch'ou-shui t'ao is divided into two parts by Hung tsui; the head of the southern arm is largely occupied by mud flats which dry.

To provide accommodation for the increasing junk traffic an 30 artificial harbour has been constructed in the south-eastern part of Ma-chia t'ao; this harbour, which is known as Hei-tsui-tzu area, is bounded south-westward by Hsiang-lu-chiao wharf, which extends north-north-westward from a position about 4 cables west-south-westward of Hei-tsui-tzu. The harbour is protected from seaward by 35 Hei-tsui-tzu (Roseiachō) breakwater, and has two piers and a dry dock on its southern side; a shoal, with a depth of a quarter of a fathom (0^m5) over it, marked by two red conical buoys, lies near the middle of the harbour. In 1948, another breakwater was under construction south-westward of Hei-tsui-tzu breakwater, as indicated 40 by pecked lines on the chart.

A light is exhibited, at an elevation of 20 feet (6^m1), from a white circular concrete structure, 16 feet (4^m9) in height, situated on the north-eastern extremity of Hei-tsui-tzu breakwater.

Northward and westward of the head of Hsiang-lu-chiao wharf 45 various areas had, in 1948, been dredged to depths of from 10 to 23 feet (3^m0 to 7^m0); their positions can best be seen on the chart. Harbour works were under construction in 1948 in the western part of Ma-chia t'ao, as indicated in pecked lines on the chart.

About 8 cables northward of Hei-tsui-tzu (*Lat. 38° 56' N., Long. 50 121° 38' E.*) is the entrance to a channel which, in 1943, was dredged to a depth of 19 feet (5^m8), leading to a wharf on the western side of Ma-chia t'ao; the entrance is marked on the northern side by red conical buoy No. 2 and, on the southern side, by black conical

Chart 3694.

buoy No. 1 ; the southern side of the channel is marked by black conical buoys Nos. 3 and 5.

Kan-ching-tzu area.—Breakwater.—Wharves.—Dangers.—Lights.

- 5 — **Fog Signal. — Beacons. — Light-buoys. — Signal station.** — Kan-ching-tzu (Kan-seishi) area is that portion of Ta-lien chiang which lies westward of Fang-po area and northward of Hsiang-lu-chiao area, and includes the northern part of Ch'ou-shui t'ao. A coaling harbour, consisting of two wharves and a breakwater, has been constructed
- 10 on the shore northward of the northern entrance to Fou-t'ou area ; the breakwater extends about half a mile southward, and berthing piers have been constructed on the western side of its southern part to form an oil wharf. A rocky shoal, with a least depth of $1\frac{1}{2}$ fathoms (3^m2) over it, lies about 3 cables eastward of the breakwater and
- 15 about the same distance offshore ; south-westward of this shoal, and close to the breakwater, is a rock with a depth of $2\frac{1}{2}$ fathoms (4^m6) over it. No. 1 wharf is parallel to the breakwater and about $1\frac{1}{2}$ cables westward of it ; it is fitted with railway lines and transporters. A small temporary pier extends from the shore between the break-
- 20 water and No. 1 wharf. No. 2 signal station is situated on the eastern side of the root of this wharf. No. 2 wharf is situated about half a mile westward of No. 1 wharf. Vessels can berth on both sides of Nos. 1 and 2 wharves.

Extensive reconstruction work was being carried out in this area

25 in 1953.

A light is exhibited, at an elevation of 42 feet (12^m8), from a red iron framework structure, 35 feet (10^m7) in height, situated on the oil wharf at the head of the breakwater ; a fog signal is sounded from this light-structure.

- 30 A light is exhibited, at an elevation of 47 feet (14^m3), from a white concrete structure, 41 feet (12^m5) in height, situated on the head of No. 2 wharf.

Leading lights are exhibited on the root of No. 2 wharf. The front light is exhibited, at an elevation of 64 feet (19^m5), from a white

35 square iron structure, 58 feet (17^m7) in height ; the rear light is exhibited, at an elevation of 108 feet (32^m9), from a similar structure, 101 feet (30^m8) in height, situated about three-quarters of a cable north-westward of the front light. These lights are in line bearing 322° . Two leading beacons, each consisting of a white post sur-

40 mounted by a triangle, are situated nearly one cable eastward of the rear leading light ; these beacons are in line bearing 322° , and indicate the eastern side of the channel leading to No. 2 wharf.

A light-buoy, No. 5, painted black, exhibiting a *white occulting* light, is moored about 3 cables southward of the head of No. 1 wharf.

- 45 A light-buoy, No. 6, painted red, exhibiting a *red flashing* light *every three seconds*, is moored nearly 2 cables south-eastward of the head of No. 2 wharf. A light-buoy, No. 7, painted black, exhibiting a *white group flashing* light, giving *three flashes every six seconds*, is moored about $1\frac{1}{2}$ cables south-westward of the head of No. 2 wharf.

50 A reef with several rocks on it, extends about one cable from Hung tsui ; foul ground extends as much as half a mile from the northern side of Ch'ou-shui t'ao between Hung tsui and No. 2 wharf.

Liu-shu-t'un area.—Islet and dangers.—Anchorage.—Piers.—Light.
 --Liu-shu-t'un (Ryūjūton) area is the section of Ta-lien chiang which

Chart 3694.

lies northward of the northern limit of Fang-po area ; it includes two bays, named Tan-shui t'ao (Tonsui tō) and Ho t'ao, respectively.

The coast between the root of Kan-ching-tzu breakwater and Lao-lung t'ou (Kyutō seki), situated about 2 miles north-north-eastward, is fringed with reefs, rocks and shoals, which extend as much as 4 cables offshore ; Hai-mao tao (Haimyō tō), an islet 15 feet (4^m6) high, lies on this shoal ground and about midway along this stretch of coast.

A light is exhibited, at an elevation of 44 feet (13^m4), from a white circular concrete column, 33 feet (10^m1) in height, on the head of an oil pier situated about half a mile north-eastward of the root of Kan-ching-tzu breakwater (*Lat.* 38° 58' N., *Long.* 121° 38' E.). A light is exhibited from the head of another pier, close westward of the above.

Tan-shui t'ao is entered between Lao-lung t'ou and Men-hua-tao chiao (Menkivatō point), situated about one mile north-eastward. Lao-lung t'ou is a steep headland, 199 feet (60^m7) high ; a rocky islet lies on a reef which extends a short distance eastward from Lao-lung t'ou. A spit, with depths of less than 3 fathoms (5^m5) over it and several rocks on it, extends about 3 cables south-south-westward from Men-hua-tao chiao. There are depths of from 2 to 3 fathoms (3^m7 to 5^m5) in the middle of Tan-shui t'ao, and it affords shelter to small vessels with northerly winds ; there are three inner bays, but they all dry. Hsiao-yen-tao chiao (Koshiojima point) is situated at the head of the bay.

Ho t'ao (Ka tō) is entered between Men-hua-tao chiao and Huang-niang-tzu chiao (Ojo point), lying nearly 1½ miles eastward ; there are depths of from 3 to 4 fathoms (5^m5 to 7^m3) in the entrance and in the middle part of the bay, and it is well sheltered from northerly winds. Liu-shu-t'un (Ryuju) village is situated on the eastern side of the bay, and is connected to the main railway system ; two iron piers extend from the coast at this village, the longer of the two being about one cable in length. Three conspicuous radio masts stand close eastward of the village. Ta-p'ing-t'an shan (Taiheinan san) is a prominent sharp peak, 259 feet (78^m9) high, situated about half a mile east-north-eastward of Huang-niang-tzu chiao.

Huang-niang-tzu-chiang shih (Kojōshiye seki), lying nearly half a mile south-south-eastward of Huang-niang-tzu chiao, is a rock awash, with depths of less than 3 fathoms (5^m5) for about half a cable all round it.

Berthing signals.—The following signals, made by flags of the International Code of Signals, were in use when the port was in Japanese occupation, and may still be in force :—

At No. 1 Signal station in Fou-t'ou area (page 691).

Signal.

Signification.

Flag F over Numeral flag 1 Secure alongside No. 1 berth, Fou-t'ou area. 45

Flag F over Numeral flag 2 Secure alongside No. 2 berth, Fou-t'ou area.

and so on, consecutively to No. 52 berth inclusive.

Flag F over Numeral flags 99 Secure at Pin-t'ing pier. 50

Flag B over Numeral flag 1 Secure to No. 1 buoy Fou-t'ou area.

Flag B over Numeral flag 2 " " No. 2 " " "

and so on, consecutively to No. 5 buoy, inclusive.

(None of the buoys in Fou-t'ou area were in position in 1953).

Charts 1798, 1256, 1262.

Chart 3694.

<i>Signal.</i>	<i>Signification.</i>
Flag J over Numeral flag 1	Berth on the western side of Ssu-erh-kou No. 1 pier.
5 Flag J over Numeral flag 2	Berth on the eastern side of Ssu-erh-kou No. 1 pier.
Flag J over Numeral flag 3	Berth on the western side of Ssu-erh-kou No. 2 pier.
Flag J over Numeral flag 4	Berth on the eastern side of Ssu-erh-kou No. 2 pier.
10 Black ball over } Answering flag }	{ Anchor in the Departure area
Black ball over flag R	Anchor in Hsiang-lu-chiao area.
Black ball over flag J	Anchor in Ssu-erh-kou area.
15 Black ball over flag F	Anchor in Fou-t'ou area.
Black ball over flag K	Anchor in Kan-ching-tzu area.

At No. 2 Signal station in Kan-ching-tzu area (page 692).

<i>Signal.</i>	<i>Signification.</i>
20 Flag K over Numeral flag 1	Secure alongside No. 1 berth, Kan-ching-tzu No. 1 wharf.
Flag K over Numeral flag 2	Secure alongside No. 2 berth, Kan-ching-tzu No. 1 wharf.
and so on, consecutively to No. 5 berth, inclusive.	
25 Flag K over Numeral flag 6	Secure alongside Kan-ching-tzu No. 2 wharf, eastern side
Flag K over Numeral flag 7	Secure alongside Kan-ching-tzu No. 2 wharf, western side
Flag K over Numeral flag 8	Secure alongside Kan-ching-tzu oil wharf

30 At night, the berthing signals are made by flashing lamp in the Morse code.

Signals.—*Storm signals.*—Storm signals are displayed from No. 2 Signal station, and from Kwantung observatory, which is situated 35 on a hill close southward of the town of Ta-lien, and about $3\frac{1}{2}$ miles westward of Huang-pai tsui (*Lat. $38^{\circ} 54' N.$, Long. $121^{\circ} 43' E.$*).

Tide signals.—Signals denoting the state of the tide are made from both Signal stations by means of a black cone hoisted between two yardarms. The cone point upwards indicates a rising tide, and 40 point downwards, a falling tide, and the various positions indicate the state of the tide as follows :—

Hoisted close up to the upper yardarm.	Top of high water or beginning of ebb.
Halfway between the yardarms	Half flood or half ebb tide.
45 At the bottom of yardarm ..	Half flood or half ebb tide.
At the bottom of yardarm ..	Beginning of flood or end of ebb tide.

Barometric signals.—Barometer comparison signals are made from both Signal stations by the International Code of Signals to show 50 the barometric pressure at 1000, as registered at the Kwantung observatory; they are hoisted about 10 minutes after the observation has been made.

Regulations.—The following are extracts from Harbour regulations for Ta-lien chiang, dated 1st March, 1954 :—

Charts 1798, 1256, 1262.

Chart 3694.

Article 8.—Vessels should signal to the Harbour-master 24 hours before arrival, reporting the approximate time of arrival, and the draught forward and aft. If carrying dangerous goods, the categories and quantity of such goods should also be reported. 5

Article 9.—Foreign vessels should apply to the Harbour-master for permission to enter or leave the harbour 48 or 24 hours beforehand, respectively. No vessel is allowed to enter or leave the harbour before approval has been obtained.

Article 12.—Vessels entering or leaving the harbour between 10 sunrise and sunset must hoist the undermentioned flags and signals. Inward-bound vessels must hoist the flags, etc. on arrival at Nan-san-shan tao; outward-bound vessels must lower the flags, etc. on clearing the harbour limit.

(a) *Chinese vessels*.—National flag, Company flag, Registered 15
Signal flags (if registered), and other necessary
signal flags.

(b) *Foreign vessels*.—National flag, Company flag, Registered
Signal flags, and other necessary signal flags.

Article 13.—Inward-bound vessels subject to quarantine should 20
hoist the relevant signals as indicated below before entering the harbour limit, and should anchor in the quarantine anchorage pending inspection. On receiving "quarantine permit" or "restricted quarantine permit," the vessel may enter the harbour.

(a) Vessels coming from an infected port should hoist Q flag of the 25
International Signal Code by day, or three red lights, vertically disposed, by night, if there is no case of infectious disease or death among the crew, passengers, or live-stock.

(b) Vessels coming from an infected port should hoist two Q flags, by day, or four lights, red, red, white, red, vertically disposed, by night, 30
if the crew, passengers, or live-stock are suspected of being infected.

(c) Vessels coming from an infected port should hoist Q and L flags, by day, or four lights, red, white, red, white, vertically disposed, by night, if death has occurred among the crew, passengers, or live-stock, 35
or if there is a corpse on board.

In the cases of (b) and (c) above, the Harbour-master must be informed by signal before arrival.

Article 16.—Foreign vessels intending to take shelter from a typhoon in Ta-lien chiang must obtain permission from the Harbour-master beforehand. 40

Article 17.—Vessels entering, leaving, or shifting berth, must obey signals from the signal station of the Harbour office.

Article 20.—If any cleared vessel, after leaving harbour should return within 12 hours owing to mechanical defect or other reasons, she is treated as remaining in harbour, and need not comply with 45
entry formalities. In such case the Master must forward a report in writing to the Harbour-master stating the reason for return. On leaving harbour again all the formalities in connection with re-clearance should be complied with.

Article 22.—Vessels navigating in the harbour must proceed at 50
dead slow speed, and have their anchors ready for letting go.

Article 28.—Vessels entering Fou-t'ou area by the eastern entrance should keep within a channel defined by lines bearing 110° from the lighthouses on either side of the eastern entrance.

Charts 1798, 1256, 1262.

Chart 3694.

Article 30.—Anchorage in the harbour is not allowed without the permission of the Harbour-master.

Article 31.—If a vessel navigating in the harbour becomes out of control through mechanical defect or other reason, she may anchor temporarily with the consent of the pilot.

Article 32.—Navigation in the harbour is not allowed in heavy fog, snow, or rain, which obstructs visibility. In such conditions, a vessel already under way should anchor clear of the channel.

Article 34.—When a vessel is entering, leaving, or shifting berth in the harbour, all boats and other fittings on board should be turned in.

Article 40.—Any vessel intending to berth or shift berth in the harbour should apply in writing to the Berthing office of the Harbour office beforehand. Berthing or shifting berth is not allowed until approval has been obtained.

Article 101.—The dumping of ballast, cinders, garbage, waste, mud, etc. into the harbour is forbidden. Application may be made for the use of a garbage boat. Infringement of this regulation renders the offender liable to a fine, and, in addition, the Harbour-master can order the offender to clean up the vicinity in question within a specified time.

Article 102.—Vessels leaving the harbour are not allowed to dump ballast, cinders, garbage, waste, mud, dirty oil or water, etc. until they have passed Nan-san-shan-tao lighthouse.

Ta-lien.—The central part of the town of Ta-lien (Dairen) lies southward of Fou-t'ou area, and it extends eastward as far as Ssu-erh-kou piers, and westward along the southern side of Ma-chia t'ao ; it is a modern commercial and industrial town with all the usual facilities. In 1942 the population of Ta-lien was 746,741.

Trade.—The principal exports are coal, maize, agricultural produce, and oils ; imports are textiles, and agricultural machinery.

Harbour facilities.—Supplies.—Communications.—There are two dry docks in the basin enclosed by Pin-t'ing pier, and there is a small dock, used by coasting vessels of from 300 to 500 tons, on the eastern side of Hei-tsui-tzu area ; for the dimensions of the largest dock see Appendix I, page 706. There are also several small slipways. Repairs of all description can be undertaken. In 1953, it was reported that one fixed crane of 60 tons capacity was available, but that no cranes were available for working cargo.

Wharves and piers in Fou-t'ou and Kan-ching-tzu areas are connected to the railway.

A large and well-equipped hospital in Ta-lien has over 1,000 beds.

A large stock of coal is maintained, and can be supplied at any of the berths in Fou-t'ou area, or at the coaling harbour in Kan-ching-tzu area.

Oil is available in limited quantities, and can be supplied alongside or by lighters.

Provisions are plentiful ; water is laid on to all the wharves.

Ta-lien is the terminus of the railway which connects with the Trans-Siberian line ; it also connects with the railway to Peking and the An-tung and Korea line. Numerous steamship lines provide regular communication with the principal ports in China, Japan and

Charts 1798, 1256, 1262.

Chart 3694.

with Europe. Ta-lien is connected with the general telegraph system ; there are cable connections with Yen-t'ai and Japan.

Deratisation.—See page 37.

Chart 1798.

5

COAST.—**Ta-lien wan to Lao-t'ieh-shan-hsi chiao.**—**General remarks.**—From Nan-shan tsui (*Lat. 38° 52' N., Long. 121° 41' E.*), described on page 685, the coast trends west-south-westward for about 28 miles to Lao-t'ieh-shan-hsi chiao (page 485), and forms the southern side of Kuan-tung pan-tao. This stretch of coast is 10 hilly and generally steep-to, with few off-lying dangers ; Lü-shun Chiang (Ryojun kō), situated near the western end, is the only harbour.

Chart 3694.

Coast.—**Islets and dangers.**—**Anchorage.**—**Storm signals.**—Lao- 15 hu-t'an ao (Rōko nada) is entered between Nan-shan tsui and Hsi tsui (Nishi point), which is situated nearly one mile westward, and affords good shelter with northerly winds in depths of from 4 to 7 fathoms (7^m3 to 12^m8). Foul ground, terminating in a rock awash, extends about a quarter of a mile south-westward from Nan-shan 20 tsui ; between this rock and the point are Lao-hu-ya (Rokoza), a rock 32 feet (9^m8) high, and an islet 45 feet (13^m7) high. A reef, on which there is a rock which dries 10 feet (3^m0), extends about 2 cables from the eastern shore near the head of the bay. There is a stormsignal station at Lao-hu-t'an (Rōkokō), a small village at the head of the 25 bay. The north-western part of the bay dries entirely ; electric trams run from this part of the bay to Ta-lien.

A sand spit, with depths of less than 3 fathoms (5^m5) over it, and terminating in a group of rocks which dry 4 feet (1^m2), extends about 4 cables from the coast 1½ miles westward of Hsi tsui. The coast 30 between Hsi tsui and this sand spit consists mostly of steep hills and cliffs. The coast between this spit and Pei-ta-shan tsui (North Oyama point), a prominent cliffy point situated about 2½ miles west-north-westward, is fringed by reefs and shoals which extend from one to 3 cables offshore. Tung-ta-lien tao (East Dairen jima), 35 95 feet (29^m0) high, lies about 2 miles south-eastward of Pei-ta-shan tsui and three-quarters of a mile offshore ; Hsi-ta-lien tao (West Dairen jima), 122 feet (37^m2) high, lies on a shoal which extends about 4 cables north-westward from Tung-ta-lien tao. A reef extends about 2 cables from the coast northward of these islets, and there are 40 shoal depths between.

Chart 1798.

Off-lying islets and dangers.—**Light.**—**Cables.**—Erh-t'o-tzu tao (Ni da) is a flat-topped islet, 204 feet (62^m2) high, lying nearly one mile south-south-westward of Tung-ta-lien tao ; several rocks lie 45 about one cable off its north-eastern side. A rocky patch, with a depth of 3 fathoms (5^m5) over it, lies about 4 cables north-eastward of Erh-t'o-tzu tao, and Hsiao tao (Ko jima), 121 feet (36^m9) high, lies about half a mile eastward of Erh-t'o-tzu tao (*Lat. 38° 50' N., Long. 121° 36' E.*).

50

Mao-tzu tao (Rohan tau), situated about 2½ miles south-south-westward of Erh-t'o-tzu tao, rises precipitously on its western side to an elevation of 265 feet (80^m8), and thence slopes down gradually

Charts 1256, 1262.

Chart 1798.

to its eastern extremity. Hsiao tao (Ko jima), a small islet 61 feet (18^m6) high, lies about 2 cables south-eastward of Mao-tzu tao. A submarine cable passes about one mile westward of Mao-tzu tao, and two more cables pass between this islet and Erh-t'ou-tzu tao; all three cables are landed at Hsing p'u (*see below*). *See page 37.*

A light is exhibited, at an elevation of 283 feet (86^m3), from a white circular concrete structure, 25 feet (7^m6) in height, situated on Mao-tzu tao (*Lat. 38° 48' N., Long. 121° 35' E.*).

- 10 **Coast.—Islets and dangers.—Beacons.—Anchorages.**—Hsing-p'u, a summer resort and suburb of Ta-lien, is situated about one mile westward of Pei-ta-shan tsui and at the western end of a sandy beach. The landing place of the three submarine cables which pass near Mao-tzu tao is marked by two pairs of transit beacons. Tai shan
15 (zan) (chart 3694), a hill 627 feet (191^m1) high, is situated nearly one mile north-north-eastward of the landing place of the cables, and Wai-t'ou (Aitō shan), 1,299 feet (395^m9) high, mentioned on page 687, is about 4½ miles westward of Tai shan.

- The coast between Hsing p'u and Hsiao-p'ing tao (Shōhei tau),
20 situated about 4½ miles south-westward, forms several rocky headlands, and reefs extend as much as 4 cables offshore. Hsiao-p'ing tao is a narrow, rocky peninsula, 261 feet (79^m6) high, connected to the mainland by a low isthmus about half a mile long, on which is a village; the south-eastern coast of the peninsula is cliffy. Ssu t'ou-tzu
25 (Shi da), an islet 150 feet (45^m7) high, lies about 1½ miles eastward of the north-eastern extremity of Hsiao-p'ing tao and there is a group of three islets between; Ta-t'ou-tzu tao (O da), the western island, is 121 feet (36^m9) high, Erh t'ou-tzu (Ni da), the next islet eastward, is 133 feet (40^m5) high, and the eastern islet is 142 feet (43^m3) high.
30 A reef extends about a quarter of a mile north-westward from Ta-t'ou-tzu tao, and about the same distance northward from Erh t'ou-tzu. Tung k'ou (ko), the bay on the north-eastern side of Hsiao-p'ing tao, has depths of from 1½ to 3½ fathoms (3^m2 to 5^m9) in its outer part, but a reef, which dries 6 feet (1^m8), lies in the middle of
35 the entrance. Small vessels with local knowledge can anchor outside Tung k'ou and northward of the islets just described, which partially shelter them from southward, in depths of from 5 to 7 fathoms (9^m1 to 12^m8).

- Hsi k'ou (Si ko), the bay on the south-western side of Hsiao-p'ing
40 tao, has depths of from 2½ to 6½ fathoms (5^m0 to 11^m9) in its south-eastern part, and affords anchorage to small vessels with local knowledge; shoals and rocks, one of which is 13 feet (4^m0) high, extend nearly 4 cables from the northern shore of the bay. There is also anchorage, in a depth of about 16 fathoms (29^m3), good holding
45 ground, outside Hsi k'ou, with the south-western extremity of Hsiao-p'ing tao bearing 106°, distant half a mile; this anchorage is sheltered from winds from between north-west and east, but the bottom is uneven.

- Ta-chian t'ou (Taiko peak) is situated about 3½ miles westward of
50 the south-western extremity of Hsiao-p'ing tao, the coast between, except for the foul ground in Hsi k'ou, being fairly steep-to; a rock, which dries one foot (0^m3), lies about one cable southward of Ta-chian t'ou. A cove, which forms the estuary of a small river, lies immediately westward of Ta-chian t'ou. Huang-shih-chü (Oseki point) is

Chart 1798.

situated about one mile westward of Ta-chian t'ou, and is the eastern entrance point of Lung-wang t'ang, another cove, which is also the estuary of a small river; a rock, 19 feet (5^m8) high, lies close off Huang-shih-chü. The village of Ta-lung-wang-t'ang-t'un (Ryūōtō) is situated on the western shore and about half a mile within the entrance. Sung tsui (Matsu point), 137 feet (41^m8) high, is the western entrance point to Lung-wang t'ang (*Lat.* 38° 49' N., *Long.* 121° 23' E.).

Between Sung tsui and a point, 213 feet (64^m9) high, situated about 3½ miles westward, is a bight with depths of from 6 to 8 fathoms (11^m0 to 14^m6) over the greater part, but a rock, 30 feet (9^m1) high, lies about 2 cables offshore about half a mile westward of Sung tsui, and rocks and shoals extend half a mile offshore in places in its western part. Three streams flow into the bight, the largest of which flows into the north-western corner.

Chia-pang tsui (Kyoho point) is situated about three-quarters of a mile south-westward of the 213-foot (64^m9) high point previously mentioned and has a beacon on it; some rocky patches, with depths of less than 3 fathoms (5^m5) over them, extend about 3 cables south-eastward from Chia-pang tsui. The coast between Chia-pang tsui and Lao-t'ieh-shan-tung chiao (Rotetsu zan), situated about 6½ miles south-westward, is described below with Lü-shun chiang and its approaches. From Lao-t'ieh-shan-tung chiao, the coast trends westward for about 3 miles to Lao-t'ieh-shan-hsi chiao, which was described on page 485.

Measured distance.—A measured distance of 3 nautical miles in a 085°—265° direction is situated between Hsiao-p'ing tao (*Lat.* 38° 49' N., *Long.* 121° 30' E.) and Huang-shih-chü; the distance is in two parts, measuring one and 2 miles, respectively. The alignments are marked by three groups of beacons, three in each group.

Tidal streams.—For several miles off the coast between Ta-lien wan and Lü-shun chiang, the west-going stream runs from about 4 hours after the time of high water at Inch'ön (Admiralty Tide Tables Standard Port) to about 2½ hours before the next high water; the east-going stream runs for the remainder of the time. The tidal streams are, however, very irregular off Lü-shun chiang, and in summer, during spring tides, the west-going stream has been observed to run for 9 hours during the daytime, and the east-going stream for 3 hours.

LÜ-SHUN CHIANG AND APPROACH.—Coast.—Dangers.—

Beacons.—The coast between Chia-pang tsui and a point situated about 6 cables westward is steep-to.

Chart 3763.

About 1½ miles westward of Chia-pang tsui is a cliffy point, with a beacon on it, from which a reef, named Mo-chu chiao (Moshu shō), extends about 3 cables southward; the outer part of this reef dries 9 feet (2^m7), and there is a beacon on its extremity.

Mo-chu yen (Moshu gan) lies nearly a quarter of a mile south-westward of the beacon near Mo-chu chiao and dries 9 feet (2^m7); it is covered by the *green* sector of the light on Lao-hu-wei shan (page 701) between the bearings of 178° and 300°.

Charts 1392, 1256, 1262.

Chart 1798.

Lao-t'ieh-shan-tung chiao (*Lat. 38° 43' N., Long. 121° 11' E.*), situated on the western side of the approach to Lü-shun chiang, is a clifly point, with a beacon on it ; two white beacons, 24 feet (7^m3) in height, are situated near the point, and in line, bearing 350°, indicate the course to Yen-t'ai (page 439). Lao-t'ieh (Liau-ti) shan, 1,512 feet (460^m9) high, is situated about 1½ miles north-westward of Lao-t'ieh-shan-tung chiao, and ridges, intersected by ravines, run down from it to the coast.

- 10 K'ai-yang chiao (Kaiyō shō), marked by a small white stone beacon, dries 8 feet (2^m4), and is the outer rock of a ledge which extends about 3 cables eastward from a point situated about 1½ miles north-north-eastward of Lao-t'ieh-shan-tung chiao. Ch'eng-t'ou tsui (Jōtō point), with a beacon on it, is situated about 1½ miles north-north-eastward of K'ai-yang chiao, the coast between being low and slightly indented. From Ch'eng-t'ou tsui to the western entrance point of Lü-shun chiang, nearly 2 miles north-north-eastward, the coast is mainly clifly, and is fringed by a reef, with depths of less than 3 fathoms (5^m5) from one to 2 cables offshore ; behind this part of the coast are the hills Ch'eng-t'ou shan (Jōtō zan), and Chi-kuan shan (Keikan san) (chart 3763).

Chart 3763.

- Light.—Fog signal.**—A light is exhibited, at an elevation of 39 feet (11^m9), from a white circular concrete structure on Mo-chu yen ; a fog bell is sounded from the light-structure.

Charts 3763, 1798.

- Lü-shun chiang.—General remarks.**—Lü-shun chiang (Ryojun kō) was formerly known as Port Arthur. When in Japanese occupation the port was divided into three areas. No. 1 Area comprised the whole of Tung chiang (Tō kō), a basin situated on the eastern side of the inner harbour ; No. 2 Area comprised the entrance channel and the portion outside as far seaward as a line joining the beacon on Ch'eng-t'ou tsui to the beacon on the coast northward of Mo-chu chiao ; No. 3 Area was between the latter line and a line from the beacon on Lao-t'ieh-shan-tung chiao to the beacon on Chia-pang tsui, and also included Hsi chiang (Nishi kō), which is situated on the western side of the inner harbour. As far as is known, these sub-divisions are still in existence.

Chart 3763.

- 40 **Outer anchorage.**—There is open anchorage, in a depth of about 5½ fathoms (10^m1), from a half to three-quarters of a mile southward of the western entrance point of Lü-shun chiang ; with winds from seaward, however, a heavy sea gets up, and boatwork is difficult.

- Entrance channel.—Lights.—Radiobeacon.—Buoyage.—Beacons.**
 45 **Signal station.**—Huang-chin shan (Ogan san) (*Lat. 38° 48' N., Long. 121° 15' E.*) rises to an elevation of 410 feet (125^m0) on the eastern entrance point of Lü-shun chiang, and has a prominent fort on its summit. Two pairs of beacons are situated near the coast westward of Huang-chin shan and on the eastern side of the channel.
 50 Lao-hu-wei shan (Rōkobi san) is a hillock on the western entrance point of Lü-shun chiang, and there is a signal station on its summit. Lao-hu-wei (Rōkobi) is a narrow tongue of land which extends about 4 cables northward from Lao-hu-wei shan and forms the western side of the entrance channel.

Charts 1392, 1256, 1262.

Chart 3763.

A light is exhibited, at an elevation of 101 feet (30^m8), from a white rectangular iron tower, 26 feet (7^m9) in height, situated on the bluff on the western side of the entrance to Lü-shun chiang. There is a radiobeacon at the lighthouse. Two beacons with triangular top-
marks stand close together a short distance eastward of this light-
structure, and there are several other beacons on Lao-hu-wei. 5

The fairway of the entrance channel to Lü-shun chiang is narrowed to about one cable by shoals which extend from either side. Two white truncated pyramidal beacons, from each of which a light is
exhibited, stand on the northern side of the harbour; the front
beacon, 30 feet (9^m1) in height, is situated about 2½ cables north-
north-eastward of the northern extremity of Lao-hu-wei, and the
rear beacon, 15 feet (4^m6) in height, lies about half a cable northward
of the front beacon. The front light is exhibited at an elevation of 15
98 feet (29^m9), and the rear light at an elevation of 138 feet (42^m1).
These lights in line, bearing 356°, lead through the fairway of the
entrance channel.

The eastern side of the southern end of the entrance channel is marked by a conical light-buoy painted in black and white vertical stripes and exhibiting a *white flashing* light showing a *short flash every two-and-a-half seconds*; the western side is marked by a can light-buoy, painted in red and white vertical stripes and exhibiting a *red flashing* light showing a *short flash every two-and-a-half seconds*. A conical light-buoy, exhibiting a *white flashing* light showing a *short flash every two-and-a-half seconds* is moored about halfway along the eastern side of the fairway. A can light-buoy, exhibiting a *red flashing* light showing a *short flash every two-and-a-half seconds* is moored about half a cable eastward of the northern extremity of Lao-hu-wei. 25

The least charted depth on the leading line, opposite Lao-hu-wei shan, is 27 feet (8^m2), but the depths increase further in. 30

Inner harbour.—Landmarks.—Lights.—Wharves and piers.—Cable.—Beacons.—Mooring buoys.—Pai-yü shan (Hakugyoku san) is a hill, with a mausoleum on its summit, situated on the northern side of the inner harbour and nearly three-quarters of a mile northward of the northern extremity of Lao-hu-wei (*Lat.* 38° 48' N., *Long.* 121° 15' E.). Piao-chung-t'a (Hyochuto), situated about 1½ cables southward of the mausoleum, is a circular tower, 250 feet (76^m2) in height, surmounted by a projectile made of cement, and was erected to the memory of the 20,000 Japanese who lost their lives in the attack on Lü-shun; nine electric lights are exhibited from the tower, at an elevation of 581 feet (177^m1), and are visible from a distance of about 15 miles seaward. 40

Tung chiang (Tō kō) is a basin in the eastern part of the inner harbour and forms No. 1 Area; it has depths of from 26 to 29 feet (7^m9 to 8^m8) almost throughout. There is a large dry dock on the northern side of Tung chiang, and a small dock and a patent slip on the eastern side. There is accommodation for about nine vessels alongside the walls of the basin, with depths, in 1945, of from 21 to 29 feet (6^m4 to 8^m8). Two beacons are situated on the southern side of the entrance to Tung chiang. 50

Continuous strong northerly winds may reduce the depths in Tung chiang by from 2 feet (0^m6) to, in extreme cases, 5 feet (1^m5).

A submarine telephone cable crosses the inner harbour from the

Chart 3763.

northern end of Lao-hu-wei to the northern side of the entrance to Tung chiang ; its landing places are marked by beacons ; *see* page 37.

There is a small bay on the northern shore of the inner harbour and immediately westward of Tung chiang. The Customs' mole extends north-westward from the eastern side of this bay, and a pier extends from the northern side ; the basin thus enclosed is suitable for small craft, and the Harbour office is situated here. There is a mooring buoy in this bay.

10 Hsi chiang (Nishi kō) is a large area on the western side of Lao-hu-wei, but the greater part of it is occupied by mud flats. An area about 3 cables wide is situated between the western side of Lao-hu-wei and the edge of the drying mud bank, which is marked by beacons. A mooring buoy is situated about $2\frac{1}{2}$ cables west-south-
15 westward of the northern extremity of Lao-hu-wei, and there is a small pier on the western side of Lao-hu-wei.

A wharf, which has a berthage length of about three-quarters of a cable, and was formerly known as Mantetsu pier, lies with its south-eastern end about $2\frac{1}{2}$ cables north-north-westward of the northern
20 extremity of Lao-hu-wei. The land immediately westward of this wharf has been reclaimed to provide further berths, formerly known as Mantetsu quay, and there are three piers and a mooring buoy within one cable south-eastward of it. There are several beacons on the front in this vicinity.

25 There is a pier at Ch'ao-chien ch'i (Shiomi zaki), which lies about 6 cables north-westward of the northern extremity of Lao-hu-wei.

Lights.—A light is exhibited, at an elevation of 43 feet (13^m1), from an iron framework structure, 33 feet (10^m1) in height, on the northern side of the entrance to Tung chiang, and another, at the
30 same elevation, from a framework structure, 30 feet (9^m1) in height, on the southern side of the same entrance.

A light is exhibited, at an elevation of 15 feet (4^m6), from a column, 11 feet (3^m4) in height, on the head of the Customs' mole (*Lat.* $38^\circ 48' N.$, *Long.* $121^\circ 15' E.$).

35 **Traffic signals.**—The following signals, made by flags of the International Code of Signals at the signal station on Lao-hu-wei shan were in use when the port was in Japanese occupation, and may still be in force :—

<i>Signal.</i>		<i>Signification.</i>
40	Flag H Vessels are prohibited from leaving the harbour.
	Flag P Vessels are prohibited from entering the harbour.
	Flag A below a black ball A vessel has been directed either to enter or leave the harbour or to shift berth ; other vessels are not to pass either inwards or outwards through the entrance channel whilst this signal is flying.
45		
50	Flag B " " "	.. Secure at No. 1 berth, Mantetsu pier.
	Flag C " " "	.. Secure at No. 2 berth, Mantetsu pier.

Charts 1392, 1256, 1262.

Chart 3763.

<i>Signal.</i>			<i>Signification.</i>	
Flag D	below	a black ball	.. Secure at No. 3 berth, Mantetsu quay.	
Flag E	„	„ „	.. Secure at No. 4 berth, Mantetsu quay.	5
Flag F	below	a black cylinder	.. Anchor as convenient in the southern part of Hsi chiang.	
Flag G	„	„ „	.. Anchor as convenient in the central part of Hsi chiang.	10
Flag H	„	„ „	.. Anchor as convenient in the north-western part of Hsi chiang, leaving the fairway clear for vessels making for or leaving the pier or quay.	15
Flag I	„	„ „	.. The berth previously arranged is obstructed ; anchor temporarily at the quarantine anchorage, and await directions.	
Flag J	„	„ „	.. A berth is not available ; anchor at the quarantine anchorage, avoiding the fairway.	20
Flag K	„	„ „	.. Proceed into Tung chiang, but you must take up the position shown by the Lü-shun branch of the Ta-lien Steamship Company's dock factory.	25
Flag L	„	„ „	.. Proceed out of harbour.	
Flag M	„	„ „	.. At present the passage through the entrance channel is not clear owing to another vessel arriving or departing ; remain where you are until a further signal is made.	30
Flag N	„	„ „	.. Cancel the last signal and look out for the signal about to be hoisted.	35

The vessel receiving any of the above signals is to reply by hoisting the answering pendant.

As vessels in the harbour are unable on most occasions to see the movements of other vessels, those leaving or entering the harbour, even after receiving the signal directing them to do so, must keep a constant lookout for signals made from the signal station on Lao-hu-wei shan (*Lat. 38° 48' N., Long. 121° 15' E.*) until the operation of leaving or entering is completed, bearing in mind that urgent signals may be made.

At night these special signals will be made by flashing lamp in the Morse code.

Charts 3763, 1798.

Regulations.—The following are extracts from the harbour regulations for Lü-shun chiang, which were in use during the Japanese occupation, and may still be in force :—

Article 2.—There is unrestricted anchorage in any part of No. 3 Area except Hsi chiang. Hsi chiang, with the quay and pier, are the anchorage or the securing berths for vessels. The quarantine

Charts 1392, 1256, 1262.

Charts 3763, 1798.

anchorage is eastward of the line drawn 185° from Lao-hu-wei-shan lighthouse and in the free anchorage of No. 3 Area.

Article 3.—Vessels wishing to anchor in any part of the port except
5 the free anchorage must obtain instructions from the Chief of the Marine Bureau ; small craft may, however, anchor without waiting for these instructions provided that they do not obstruct the fairway or impede navigation.

Article 5.—Within the port vessels may not shift berth without the
10 permission of the Chief of the Marine Bureau ; this does not apply in cases of bad weather, fire or other unavoidable circumstances. If, in accordance with any of these circumstances, vessels have shifted their berths, they must immediately report their reasons and new
15 berth to the Chief of the Marine Bureau.

Article 6.—Vessels entering the port must hoist their National
15 ensigns and names in the International Code of Signals, and at night exhibit the regulation lights, and keep them hoisted until they reach their berths, or when leaving the port from the time they leave their berths until outside the harbour.

Article 7.—Vessels arriving at the port from places outside Kwangtung province must undergo quarantine examination, and must hoist
20 the quarantine signal before entering.

Article 8.—Vessels to which the previous Article applies must anchor in the quarantine anchorage, and must hold no communication
25 with the shore or with other vessels, nor may passengers, crew or any article be landed, until permission has been obtained.

Article 9.—Vessels plying solely on the coasts of Kwangtung province should hand in a report of arrival immediately they have entered.

Article 13.—Within 24 hours of a vessel's arrival in port, she must
30 send in to the Marine Bureau a nominal list of the crew, a certificate of registry or corresponding document, and a clearance permit from her last port of departure. This, however, does not apply if she leaves within 24 hours of her arrival without landing any passengers
35 or cargo.

Article 14.—Vessels must report their intending departure one hour before the time for leaving, and they may not leave the port unless they have received permission to do so. Vessels must hoist the departure flag 12 hours before sailing.

Article 15.—Vessels which remain at anchor for more than 24 hours
40 after receiving the permit for departure may not leave port without repeating the procedure of Articles 13 and 14. This does not apply in cases where cargo has not been handled.

Article 16.—Vessels returning to port within 12 hours of departure
45 owing to damage, for repairs, or for any other reason, may furnish a statement of such reasons in writing to the Chief of the Marine Bureau instead of sending in the usual report of arrival.

Article 19.—If an entering vessel is outside the entrance channel she must give way to a departing vessel. Vessels in the entrance
50 channel or in the fairway must not unnecessarily stop, anchor, cast off a tow, or do anything to obstruct the fairway ; sailing vessels must not tack in the channel.

Article 38.—Vessels in the harbour must moor with two anchors, except when secured to the pier, quay, or a mooring buoy.

Charts 1392, 1256, 1262.

Charts 3763, 1798.

Article 39.—A vessel at anchor in the harbour must not attach a buoy to her anchor.

Article 42.—Vessels under way in the harbour must only proceed at a speed sufficient for steerage way. They must not proceed abreast one another, and in the entrance channel they must not cross the bows of or overtake another vessel.

Article 49.—No rubbish, ashes, or oil waste or similar substance may be thrown into the water or on the shore of No. 2 Area or in Hsi chiang. Oil waste may be discharged in No. 3 Area, except in Hsi chiang. If a lighter is required for the disposal of rubbish or ashes, flags F T of the International Code of Signals or a blue flag must be hoisted.

Chart 3763.

Town of Lü-shun.—The town of Lü-shun is situated on the northern side of the port, and is divided into two parts by Pai-yü shan (page 701). The Old town is the eastern part, and the New town is on the north-western side of Hsi chiang. In 1940 the total population was 35,398.

Harbour facilities.—Supplies.—Communications.—Repairs can be undertaken. There are two dry docks and a patent slip; for the dimensions of the largest dock *see* Appendix I, page 706.

In 1949, there were three cranes, with capacities of 20, 40, and 100 tons, respectively.

There is a hospital in the Old town.

Provisions are obtainable. The quantity of coal in stock varies, and it is usually obtained from Ta-lien; fuel oil can be obtained. Water is obtainable alongside in Tung chiang.

Lü-shun is the terminus of the branch of the railway from Ta-lien. There are no regular steamship services. Lü-shun is connected with the general telegraphic system, and there is a telephone service.

Storm signals.—Storm signals are exhibited at the root of the pier (*Lat. 38° 48' N., Long. 121° 15' E.*) in the small bay immediately westward of Tung chiang.

Trade and shipping.—The principal exports are coal, silicon, and salt.

In general, only small coasters call at the port.

Deratisation.—*See* page 37.

Charts 1392, 1256, 1262.

APPENDIX I

LIST OF PORTS AVAILABLE FOR UNDER-WATER REPAIRS, with Details of Largest Dry or Floating Dock or Patent Slip at each Port.

NAME OF PORT AND TYPE OF DOCK, &c.	Length from Bilge of Caisson or Mitre Post of Gates at		Maximum Length of Keel Blocks	Breadth of Entrance at		Depth at M.H.W.S. over				Springs rise	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS
	Coping Head	Floor Head		Coping	M.H.W.S. level	Sill	Blocks at		Maximum Depth over Blocks		Lifting Power			
							Entrance (7)	Head (8)						
												Forward (10)	Aft (11)	
	(1)*	(2)*	(3)	(4)†	(5)†	(6)	(7)	(8)	(9)	feet	feet	feet	tons	(13)
Hsia-men : Dry dock	310	—	298	60	34*	15 at H.W.N.	—	—	20	—	—	—	—	*At bottom of batter. Caisson badly corroded ; probably not watertight.
Fu-chou (MA-WEI ANCHORAGE) : Dry dock	375	318	—	90	—	14*	—	—	15	—	—	—	—	*Should be treated with great reserva- tion because of silting.
Kao-hsiung : Dry dock	216	—	—	59	—	13	—	—	2½	—	—	—	—	Can take shallow draught vessels up to 1,000 tons.
MA-KUNG CHIANG : Dry dock	328	285	285	—	80	18-25	17-1	—	8½	—	—	—	—	
CHI-LUNG CHIANG : Dry dock	720	—	—	—	82	28	—	—	2½	—	—	—	—	
YIN-HSIEN : Dry dock	224	—	—	40	36*	12-5	—	—	8½	—	—	—	—	*At bottom of batter. No sill. Depth at entrance 12½ feet at H.W.O.S.T.
SHANG-HAI : Chiang-nan dry dock No. 3	631	629-5	591-5	76-25	76-25	20	—	—	10½	—	—	—	—	
CH'ING-TAO : Dry dock	482-7	—	—	75	59*	23**	—	—	12½	—	—	—	—	*At bottom. ** At H.W.O.S.T. { 26-25 feet at highest springs. 16-25 feet at lowest neaps.
T'IENTSING (T'ANG-KU) : Dry dock	535	500	500	43	43	10-5	11-5	11-5	9	—	—	—	—	
Mos'po : Patent slip	—	—	—	—	—	—	—	—	11½	—	—	—	—	No information. Wet dock (under construction).
ICH'ON : CHUNANP'O : Dry dock	—	—	—	—	—	—	—	—	18	—	—	—	—	No information.
TA-LIEN CHIANG : Dry dock	560	—	—	62	—	33	—	—	10	—	—	—	—	
LU-SHUN CHIANG : Dry dock	535	—	—	97-25	83-5	35-5	34	—	8½	—	—	—	—	

* In the case of Floating Docks, Patent Slips, &c., column (1) = Extreme length; column (2) = Length on blocks or cradle.
† In the case of Floating Docks, column (4) = Breadth at top; column (5) = Breadth at bottom of dock.

APPENDIX II

LIST OF PRINCIPAL PORTS, SHOWING PARTICULARS
OF DEPTHS, &c.

PORT	Depth below Chart datum level		Rise of Tide		REMARKS
	In channel of approach	In anchorage	Spgs.	Nps.	
Shan-t'ou . . .	11 feet on bar (in 1937)	5 to 7 fms.	Feet 7½	Feet 7	
Hsia-men :					
Outer harbour	About 7 fms.	7 to 12 fms.	—	—	Vessels berth at mooring buoys.
Inner harbour	5 to 8 fms.	4½ to 16 fms.	20	17	
Ma-kung chiang.	5 to 12 fms.	5½ to 8 fms.	8½	7½	
Ma-wei anchorage:					
Outer bar . . .	14 feet . . .	Available for all vessels that can cross the bar	15	12½	
Inner bar . . .	10½ feet . . .				
Kao-hsiung chiang	4 fms. . . .	3½ to 4½ fms.	2½	1½	Quays and moor- ing buoys.
Chi-lung chiang :					
Outer harbour	Deep	7 to 9 fms.	—	—	Quays and moor- ing buoys.
Inner harbour	36 feet . . .	30 to 36 feet	2½	2½	
San-tu yang . .	Deep	8 to 10 fms.	25	20	
Shang-hai . . .	About 3½ fms.	4 to 8 fms.	10½	7	
Ch'ing-tao :					
Outer harbour	Deep	3 to 10 fms.	12½	9½	Depths of 27 to 30 feet along- side wharves in Ta chiang.
Inner harbour		3 to 8 fms.			
Yen-t'ai :					
Southern en- trance	4½ fms. . . .	2½ to 9 fms. in outer harbour	6½	6½	Depths of from 10 to 25 feet in inner harbour.

LIST OF PRINCIPAL PORTS, ETC.—*continued.*

PORT	Depth below Chart datum level		Rise of Tide		REMARKS
	In channel of approach	In anchorage	Spgs.	Nps.	
			Feet	Feet	
Yen-t'ai (<i>contd.</i>) Northern en- trance . . .	6 to 9 fms.		—	—	
T'ien-ching . . .	15 feet on Taku bar (in 1946)	8 fms. in Taku road	9	8½	Vessels with a draught of about 13 feet can reach Tien- tsin. Depths of 28 feet alongside in T'ang-ku New harbour.
Ch'ing-huang-tai.	24 feet	20 to 30 feet alongside quays	4½	—	
Ying-k'ou . . .	9 feet	12 to 29 feet	11½	8½	
Inch'ön . . .	6 fms.	6½ fms.	28½	21½	Depth of about 28 feet in tidal basin in inner harbour.
Chinnanp'o . . .	6 to 12 fms.	7 to 15 fms.	18	14	Depths of about 20 feet along- side quays in basin.
Ta-lien Chiang . . .	4 to 7 fms.	24 to 35 feet in artificial harbour	10	8	
Lü-shun Chiang . . .	28 feet	21 to 38 feet	8½	7	

APPENDIX III

LIST OF SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS.

Place	Approximate position	Description.
SHAN-T'OU	Lat. 23° 21' N. Long. 116° 40' E.	<p>Close re-occupation of C.I.W. station of 1906: near the water front on the northern bank of the river, in the compound of the English Presbyterian Mission and almost opposite the front porch of the middle one of three mission residences in line, facing the water front; marked by a circular block of granite, with the top inscribed "C.I.W. 1917", and left 10 inches above the surface of the ground.</p> <p>Near end of curve of roof of large building 056° 02', distant half a mile.</p> <p>Near gable end of roof of detached mission residence 088° 29', distant about 150 feet.</p> <p>S.E. corner of east chimney of the Principal's house 135° 18', distant about 120 feet.</p> <p>Bottom of west side of porch of middle house of three 164° 01'.</p>
HSIA-MEN	Lat. 24° 28' N. Long. 118° 04' E.	<p>Exact re-occupation of C.I.W. station of 1906: in the south corner of the lawn of the British Consul's residence on Ku-lang hsi; marked by a granite cylinder 18 inches in diameter, projecting 8 inches above the ground, on top of which is a brass plate giving the latitude and longitude as previously determined.</p> <p>Top of pagoda on mountain 003° 59', distant about 5 miles.</p> <p>West corner of Consul's residence 152° 35'.</p> <p>East corner of Consul's residence 195° 14'.</p> <p>Bottom of right side of flagstaff 238° 00'.</p>
SAN-TU YANG	Lat. 26° 38' N. Long. 119° 40' E.	<p>On the lawn in front of the Custom house and roughly in line with its south-western side; marked by a granite block having "C.I.W. 1917" inscribed on two sides, projecting about 6 inches above the ground.</p> <p>West boundary stone of Custom's grounds 094° 32', distant about 200 feet.</p> <p>Bottom of Custom's flagstaff 172° 11'.</p> <p>Bottom of tide gauge 357° 10', distant about 1000 feet.</p> <p>Right gable of upper of two grey houses at base of conical mountain 245° 58', distant about half a mile.</p>

LIST OF SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS—*continued*.

Place	Approximate position	Description
YIN-HSIEN	Lat. $29^{\circ} 53' N$. Long. $121^{\circ} 33' E$.	<p>Close re-occupation of C.I.W. station of 1906: northward of the foreign concession at the western end of the recreation ground of the English Methodist College; marked by a stone block, with a cross indicating the exact centre, left just below the surface of the ground.</p> <p>Top of steeple of St. Paul's church $033^{\circ} 56'$, distant three-quarters of a mile. Ball on centre gable of Industrial School . . . $230^{\circ} 02'$, distant two cables. Cross on Roman Catholic church $333^{\circ} 45'$, distant about $3\frac{1}{4}$ cables.</p>
YING-K'OU	Lat. $40^{\circ} 40' N$. Long. $122^{\circ} 13' E$.	<p>Exact re-occupation of C.I.W. station of 1907: on garden property of B. C. Carlos; marked by a granite stone with a cross cut in the top face to mark the exact spot.</p> <p>Cross on steeple of St. Nicholas church . . . $094^{\circ} 02'$, distant half a mile. N.E. turret of Roman Catholic church . . $117^{\circ} 50'$, distant half a mile. Lowest visible portion of Custom's flagstaff. $125^{\circ} 56'$, distant half a mile.</p>

APPENDIX IV

Anchorage between Fokai point and Shang-hai, where shelter can be obtained by vessels of moderate draught during the north-east monsoon.

Anchorage.	Approximate distance from Hong-Kong.	Approximate distance from last-named anchorage.	Remarks.
	By in-shore track.		
	Miles.	Miles.	
Kuei-ling chou, Chou-pa wei	75	—	Fair anchorage.
Che-lang chiao	83	9	Good anchorage.
Chino bay	98	15	Good shelter, but some swell.
Chia-tzu Chiang	115	20	Fair anchorage, but with heavy swell occasionally from southward.
Shen-ch'üan Chiang	128	18	Fair anchorage, but with heavy southerly swell.
Leng-hua-feng anchorage	134	7	Fair anchorage.
Hai-men wan	154	20	Fair anchorage, but Hope bay is preferable.
Ch'i-wang wan	160	10	Secure anchorage.
*Ch'ang-shan po-ti, Nan-ao tao	180	20	Secure anchorage.
Che-lin wan	193	13	Good anchorage.
Hou wan	202	18	Fair anchorage, but should not be used during typhoon months.
Hu hsü	205	3	Fair anchorage, but open to the swell.
*Tung-shan Chiang	220	15	Secure anchorage.
Ta-yü chiao	235	16	Fair anchorage, but open to heavy swell.
Chiang-chun ao	243	9	Fair anchorage for small vessels.
Lin-yu hsü	257	14	Temporary shelter only.
Ting-t'ai wan	262	5	Fair anchorage for small vessels.
Liao-lo wan	282	21	Fair anchorage ; a heavy swell with strong north-east monsoon.
Wei-t'ou ao	295	14	Good anchorage.
Mei-chou wan	338	44	Good anchorage.
*Hsing-hua wan	373	—	Secure anchorage.
Kerr island, Hsing-hua shu-tao	373	20	Good anchorage.
Station island, Hai-t'an hsia	381	8	Good anchorage.
Ma-tsu ao	430	50	Secure anchorage.
Shuang-feng tao	456	26	Good anchorage.

*Typhoon harbour.

Anchoarages between Fokai point and Shang-hai, where shelter can be obtained by vessels of moderate draught during the north-east monsoon.—
continued.

Anchorage.	Approximate distance from Hong-Kong.	Approximate distance from last-named anchorage.	Remarks.
	By in-shore track.		
	Miles.	Miles.	
*Little pass, Feng-huo shan	460	24	Secure anchorage. Typhoon anchorage for one vessel.
*Nan-kuan chiang and Pei-kuan chiang	500	27	Secure anchorage.
Tapeh lieh-tao	540	40	Sheltered anchorage for small vessels.
*Hei-niu wan	550	58	Secure anchorage.
*Lo-ch'ing wan	570	30	Good anchorage.
Ta-lu shan	573	24	Good anchorage.
*T'ai-chou lieh-tao	610	22	Good anchorage.
T'ou-men shan	622	15	Good anchorage.
Shih-p'u mao-tai	664	14	Indifferent anchorage.
Chiu-shan lieh-tao	670	22	Good anchorage.

NOTE.—In the in-shore passage between Fo-tu shan and Shang-hai, the north-east monsoon has but little force; the great rate of the tidal streams must be guarded against.

*Typhoon harbour.

APPENDIX V

**LIST OF NAMES APPEARING ON CHARTS OF THE MAINLAND OF CHINA
PRODUCED BY THE CHINESE HYDROGRAPHIC OFFICE IN FORMOSA
WHICH DIFFER FROM THOSE USED IN THIS BOOK.**

NOTE.—The Chinese words "hsü," "chiang", and "ch'i" are usually rendered, respectively, as "yü", "kan", and "hsi" on the Chinese charts. Names which contain these words are not included in this list unless they differ from names used in this book in some other respect as well.

Name on Chinese chart.	Name in this book.	Page.
Ai-liu chiao	Agnew point. . . .	309
An shan	Hsiao-hsiung shan. . . .	158
An-sheng shih	Andersen rock	336
Ao t'ou	Au t'o	162
Ao-pien chiao	Opium point	101
Ao-tung shan	Mount Alton	260
Chai-feng shan	Chia-teng shan	311
Chai-shan men	Hall pass	337
Chai-tzu kan-tao . . .	Ts'e-tzu shui-tao . . .	323
Ch'ai-tzu shan	Ts'e-tzu shan	324
Chan yü	Chang hsü	371
Ch'ang yü	Long island	153
Ch'ang-ch'i tao	Pei-kan-tang tao	165
Chang-chi yü	Tangki tao	165
Chang-chia chiao . . .	Long-ka point	331
Ch'ang-jih tao	Ch'ih-shan hsü	144
Ch'ang-pin shan	Ch'ing-ping shan	308
Ch'ao tsui	Tide point	90
Ch'ao-t'ou men	Paymaster passage . . .	360
Ch'aun-ao chiao	Barrow point	320
Chen ao	Deng ao	255
Chen chiao	Town point	152
Chen shan	Town hill	112
Ch'en-ch'i t'ou	Chi-t'ou shan	105
Ch'en-chia kan-tao . . .	Shen-chia shui-tao . . .	314
Chen-chia-men	Shen-chia-men	315
Chen-hsing shan	Chu shan	332
Chen-t'ou yü	Shang-p'an chiao	312
Chi yü	Flag island	152
Chiang-hsin-szu	Kiang-hsin-szu	279
Chiang-kung chiao . . .	Chiong-kun-ta	124
Ch'iang-lan shih	Cockchafer rock	90
Chiao tou	Bluff head	165
Chiao-chi	Edna islets	311
Chiao-hsi-so	Chueh-ch'i-so-cheng . . .	297
Chiao-men chiao	Medusa point	303
Chiao-pei shan	Li-chiao-pei	309
Ch'iao-tui	Coffin islets	100
Chien chiao	Peaked rock	90
Chien feng	Ta-chai shan	159
Ch'ien-ao chiao	Chino reef	86
Ch'ien-ao wan	Chino bay	86
Ch'ien-shui chiao	Pei shan	105
Chien-shui ho	Chieh-chien ho	456
Ch'ien-shui wan	Niu-mu-chiao ao	106
Chien-t'a shan	Pyramid hill.	159
Chien-t'a shih	Steeple rocks	256
Chien-t'a yü	Pai-ya	113
Ch'ih chiao	Red rock	156
Ch'ih hsi	Mitre rock	107

Name on Chinese chart.	Name in this book.	Page.
Chih yü	Nan-tung tao	111
Chih-chih men	Hewett pass	337
Chih-chung shan	Cluster islets	343
Chih-fu tao	Chih-fou tao	441
Chih-li hai-hsia	Pohai strait	446
Ch'i-hsing shui-tao	Bowring channel	260
Ch'i-jen-men shan	Nine Pin island	290
Chi-kuan chiao	Ridge point	256
Ch'i-lin shan	Chung-jong-mu	300
Chin shan	Ta-chin shan	355
Chin shih	Chinta	122
Chin-chi men	Lo-t'ou men	332
Chin-chow wan	Chin-chou wan	489
Ching shih	Ching rock	112
Ching-ao	Ching-au	165
Ching-che chiao	Ching-sia	124
Ch'ing-hsi	Pei-ch'i-tao	326
Ch'ing-huang-tao	Ch'in-huang-tao	476
Ch'ing-huang-tao po-ti	Ch'in-huang-tao road	476
Ching-lung men	Gough pass	319
Ching-men shan	Chiao-mu shan	297
Ch'ing-shan shui-tao	Granville channel	257
Ching-tan kan-tao	Chin-t'ang yang	325
Ching-t'ang tsui	Tsingtang tsui	288
Ch'ing-tzu men	Cheng-tzu Chiang	310
Chin-ho tao	Chin-ho shan	312
Chin-hsin chiao	Pass rocks	151
Chi-niang chiao	Tooth rock	312
Chi-nieng shan	Chi-lung shan	313
Chin-lieh-tun shan	Ch'ing-lei-t'ai	333
Chin-men t'an	Chin-men tui	119
Chin-men-k'ou t'an	Spit bank	119
Chin-men-t'an tsui	Chin-men tui-tsui	119
Chin-pai chiao	Chin chiao	171
Chin-shan chia	Keensangah	151
Chin-she shan	Hump islands	259
Chin-so men	Waterwitch channel	256
Chin-tang shui-tao	Chin-t'ang yang	325
Chin-yu tao	Hsien shan	158
Chin-yüan tao	Dollar point	107
Chi-sha-shui chiao	Two Boulder point	113
Chi-sheng shih	Gibson rock	102
Chi-tien chiao	Difficult point	106
Chi-tien chiao	Ternate rock	106
Chi-tien hsi	Difficult islet	106
Ch'i-tzu-wei sha-tsui	Anson spit	123
Chiu shan	Round islet	149
Chiu yü	Hill island	152
Chiu-yu	Kiao-tse	165
Chou-k'o-k'o feng	Ta-mao shan	83
Chou-k'o-k'o wan	Chou-k'o-k'o Chiang	108
Chou-po chow	Chou-po chou	122
Chou-shan tao	Chou shan	306
Chow-tzu wei	Chou-tzu wei	124
Chu chiao	Pillar rock	153
Chu tao	Chu shan	298
Chu yü	T'ou-men shan	289
Ch'uang-pi shan	Ch'uan-pi shan	322
Chuang-tan yü	Junksail islet	150
Chu-chi shan	Kou-chi shan	368
Chu-chia feng	Ta shan	312
Chu-chia kan-tao	Freemantle channel	311
Chu-men-lieh yü	Chumung islets	302
Chung chiao	Middle reef	85
Chung sha	Middle ground	120
Chung yü	East islet	90
Chung-pao	Chung-pao chiao	366

Name on Chinese chart.	Name in this book.	Page.
Chung-tsang	Jong-jong	300
Chu-t'ou-pi	Chao-t'ou	257
Chu-yü shan	Pai shan	354
Chu-yu sha-tsui	Singleton spit	340
E chiao	O chiao	326
E chiao	Baker rocks	370
Erh-lien tao	Hsiao-lien tao	154
E-shou pi	O-shou pi	164
E-t'ou-keng	O-t'ou-chung	298
E-yü chiao	O-yü chiao	326
Fang-chan yü	Abbott island	151
Fan-kai shan	Dor-yung	298
Fei-hu-tang	Fei-hoo bank	81
Fei-yü shih	Flying Fish rock	112
Feng tao	Feng hsü	100
Feng-ch'ao yen	Wu chiao	358
Feng-k'o yü	Wang-ma hsü	149
Fen-shui chiao	Feng-shui chiao	312
Fu-an ho	Chiao ch'i	255
Fu-chow wan	Fu-chou wan	495
Fu-erh shih	Folkestone rock	101
Fu-jen chiao	Fu-jen hsü	309
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NOTE.—Names used on charts of the mainland of China published by the Chinese Hydrographic Office in Formosa which differ from those used in this book or on Admiralty charts will be found in Appendix V., page 713.

Names in this index which have such alternative renderings are marked with an asterisk.

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Lu-mang-ch'i-kou pi	201	Facilities	705	Lu-mo-yung, <i>see</i> Tung-pai-lien shan	309	Inner harbour	701	Lung :		beacons	702	Chiao (Min chiang)	171	cable	701	Chiao (Elliot islands)	367	lights	702	Chiao (Hsü-kung tao)	363	mooring buoys	702	Hsü	273	Outer anchorage	700	Shan (Chiao-chou wan), <i>see</i> Fou shan	409	Regulations	703	Shan (Hai-yang vicinity), <i>see</i> Yü-huang ting	419	Trade and shipping	705	Lung-ao	100	Traffic signals	702	* Po-ti	101	Lutao tsui	401	anchorage	101	Lu-t'o tao	491	Lung-chu	269	Lu-tou-t'ou	404	Lung-dun, <i>see</i> Hsiao-liang-t'ou	308	Lu-tu-tao	426	Lung-hsü-tao k'ou	429	Lu-t'zu hsü	142	Lung-hua tsui	382	Lu-wang, <i>see</i> Liu-heng tao	300	Lung-k'ou	453	Lu-wang, Cape; <i>see</i> Tung-lang tsui	309	Chiang	453	Lu-yeh-t'ou	296	anchorages	454	Lu-ying	268	beacons, buoys	453	Luzon, northern side	181	facilities	454	Tidal streams	181	lights	454	Luzon strait	187	Wan	453	Lwan ho, <i>see</i> Luan ho	475	tidal streams	454	*Lwan point	310	Lungkow, <i>see</i> Lung-k'ou	453	Lwankiakau, <i>see</i> Ch'in-chia-k'ou	452	Harbour, <i>see</i> Lung-k'ou chiang	453	Lyne rock	309	Lung-men :				Ao, <i>see</i> Ch'ien-shui wan	101	Ma :		Chiang	439	Chiao	162	P'ing-chou	439	Do (Chongdung hae)	548	Lung-miao tsui	433	Do (Kwansu gak)	590	Lung-mu chiao	273	Do (Naju kundo)	543	Lungmun :		Hsü	316	Flats, <i>see</i> Lung-men p'ing-chou	439	Shan (Shan-tung kao-chiao)	428	Harbour, <i>see</i> Lung-men chiang	439	Shan (Yen-t'ai)	439	River, <i>see</i> Hsin-an ho	439	Tao	93	Lung-munn chiang	425	To'-tzu	672	Lung-tai railway	396	Maan do (Amnok kang)	666	Lung-t'ien yen	254	Light	667	Lung-tou jetty	127	Maan do (Soan kundo)	517	Lungtse	440	Ma-an lieh-tao	368	Lung-tung tsui	444	Northern part	372	Lung-wan t'ou	278	North-eastern part	371	Lung-wang t'ang	699	North-western part	370	Lung-wen	216	Southern part	368	Lung-ya shih	169	Tidal streams	368	Buoys	169	Ma-an shan (Chi-chu lieh-tao)	361	Lung-yen cove, <i>see</i> Lung-yen wan	431	*Ma-an shan (Chin-t'ang shan)	324	Lung-yen wan	431	Ma-an shan (Chou shan)	328	Lun-kau bay, <i>see</i> Lung-k'ou wan	453	Ma-an shan (Hobart channel)	308	Lu-shi san, <i>see</i> Lu-shi shan	311	Ma-an shan (Hu-lu-tao kao-chiao)	483	*Lu-shi shan	311	Ma-an shan (Ma-an lieh-tao)	368	Lü-shun	705	Maan shan (Min chiang), <i>see</i> Ch'iu-lung shan	169	Storm signals	705	Ma-an tao	252	Lü-shun chiang	700	Ma-an-shan hsü	217	Approach	699	Mabaag, <i>see</i> Mabag	188	beacons, light	700	Mabag	188	measured distance	699	Mabatui point	193	Deratisation	705	Mabudis island	195	Dry dock	706	Mabup'o mal	539	Entrance channel	700	Mac Allum, Mount	257				
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Lung :		beacons	702	Chiao (Min chiang)	171	cable	701	Chiao (Elliot islands)	367	lights	702	Chiao (Hsü-kung tao)	363	mooring buoys	702	Hsü	273	Outer anchorage	700	Shan (Chiao-chou wan), <i>see</i> Fou shan	409	Regulations	703	Shan (Hai-yang vicinity), <i>see</i> Yü-huang ting	419	Trade and shipping	705	Lung-ao	100	Traffic signals	702	* Po-ti	101	Lutao tsui	401	anchorage	101	Lu-t'o tao	491	Lung-chu	269	Lu-tou-t'ou	404	Lung-dun, <i>see</i> Hsiao-liang-t'ou	308	Lu-tu-tao	426	Lung-hsü-tao k'ou	429	Lu-t'zu hsü	142	Lung-hua tsui	382	Lu-wang, <i>see</i> Liu-heng tao	300	Lung-k'ou	453	Lu-wang, Cape; <i>see</i> Tung-lang tsui	309	Chiang	453	Lu-yeh-t'ou	296	anchorages	454	Lu-ying	268	beacons, buoys	453	Luzon, northern side	181	facilities	454	Tidal streams	181	lights	454	Luzon strait	187	Wan	453	Lwan ho, <i>see</i> Luan ho	475	tidal streams	454	*Lwan point	310	Lungkow, <i>see</i> Lung-k'ou	453	Lwankiakau, <i>see</i> Ch'in-chia-k'ou	452	Harbour, <i>see</i> Lung-k'ou chiang	453	Lyne rock	309	Lung-men :				Ao, <i>see</i> Ch'ien-shui wan	101	Ma :		Chiang	439	Chiao	162	P'ing-chou	439	Do (Chongdung hae)	548	Lung-miao tsui	433	Do (Kwansu gak)	590	Lung-mu chiao	273	Do (Naju kundo)	543	Lungmun :		Hsü	316	Flats, <i>see</i> Lung-men p'ing-chou	439	Shan (Shan-tung kao-chiao)	428	Harbour, <i>see</i> Lung-men chiang	439	Shan (Yen-t'ai)	439	River, <i>see</i> Hsin-an ho	439	Tao	93	Lung-munn chiang	425	To'-tzu	672	Lung-tai railway	396	Maan do (Amnok kang)	666	Lung-t'ien yen	254	Light	667	Lung-tou jetty	127	Maan do (Soan kundo)	517	Lungtse	440	Ma-an lieh-tao	368	Lung-tung tsui	444	Northern part	372	Lung-wan t'ou	278	North-eastern part	371	Lung-wang t'ang	699	North-western part	370	Lung-wen	216	Southern part	368	Lung-ya shih	169	Tidal streams	368	Buoys	169	Ma-an shan (Chi-chu lieh-tao)	361	Lung-yen cove, <i>see</i> Lung-yen wan	431	*Ma-an shan (Chin-t'ang shan)	324	Lung-yen wan	431	Ma-an shan (Chou shan)	328	Lun-kau bay, <i>see</i> Lung-k'ou wan	453	Ma-an shan (Hobart channel)	308	Lu-shi san, <i>see</i> Lu-shi shan	311	Ma-an shan (Hu-lu-tao kao-chiao)	483	*Lu-shi shan	311	Ma-an shan (Ma-an lieh-tao)	368	Lü-shun	705	Maan shan (Min chiang), <i>see</i> Ch'iu-lung shan	169	Storm signals	705	Ma-an tao	252	Lü-shun chiang	700	Ma-an-shan hsü	217	Approach	699	Mabaag, <i>see</i> Mabag	188	beacons, light	700	Mabag	188	measured distance	699	Mabatui point	193	Deratisation	705	Mabudis island	195	Dry dock	706	Mabup'o mal	539	Entrance channel	700	Mac Allum, Mount	257												
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Chiao (Elliot islands)	367	lights	702	Chiao (Hsü-kung tao)	363	mooring buoys	702	Hsü	273	Outer anchorage	700	Shan (Chiao-chou wan), <i>see</i> Fou shan	409	Regulations	703	Shan (Hai-yang vicinity), <i>see</i> Yü-huang ting	419	Trade and shipping	705	Lung-ao	100	Traffic signals	702	* Po-ti	101	Lutao tsui	401	anchorage	101	Lu-t'o tao	491	Lung-chu	269	Lu-tou-t'ou	404	Lung-dun, <i>see</i> Hsiao-liang-t'ou	308	Lu-tu-tao	426	Lung-hsü-tao k'ou	429	Lu-t'zu hsü	142	Lung-hua tsui	382	Lu-wang, <i>see</i> Liu-heng tao	300	Lung-k'ou	453	Lu-wang, Cape; <i>see</i> Tung-lang tsui	309	Chiang	453	Lu-yeh-t'ou	296	anchorages	454	Lu-ying	268	beacons, buoys	453	Luzon, northern side	181	facilities	454	Tidal streams	181	lights	454	Luzon strait	187	Wan	453	Lwan ho, <i>see</i> Luan ho	475	tidal streams	454	*Lwan point	310	Lungkow, <i>see</i> Lung-k'ou	453	Lwankiakau, <i>see</i> Ch'in-chia-k'ou	452	Harbour, <i>see</i> Lung-k'ou chiang	453	Lyne rock	309	Lung-men :				Ao, <i>see</i> Ch'ien-shui wan	101	Ma :		Chiang	439	Chiao	162	P'ing-chou	439	Do (Chongdung hae)	548	Lung-miao tsui	433	Do (Kwansu gak)	590	Lung-mu chiao	273	Do (Naju kundo)	543	Lungmun :		Hsü	316	Flats, <i>see</i> Lung-men p'ing-chou	439	Shan (Shan-tung kao-chiao)	428	Harbour, <i>see</i> Lung-men chiang	439	Shan (Yen-t'ai)	439	River, <i>see</i> Hsin-an ho	439	Tao	93	Lung-munn chiang	425	To'-tzu	672	Lung-tai railway	396	Maan do (Amnok kang)	666	Lung-t'ien yen	254	Light	667	Lung-tou jetty	127	Maan do (Soan kundo)	517	Lungtse	440	Ma-an lieh-tao	368	Lung-tung tsui	444	Northern part	372	Lung-wan t'ou	278	North-eastern part	371	Lung-wang t'ang	699	North-western part	370	Lung-wen	216	Southern part	368	Lung-ya shih	169	Tidal streams	368	Buoys	169	Ma-an shan (Chi-chu lieh-tao)	361	Lung-yen cove, <i>see</i> Lung-yen wan	431	*Ma-an shan (Chin-t'ang shan)	324	Lung-yen wan	431	Ma-an shan (Chou shan)	328	Lun-kau bay, <i>see</i> Lung-k'ou wan	453	Ma-an shan (Hobart channel)	308	Lu-shi san, <i>see</i> Lu-shi shan	311	Ma-an shan (Hu-lu-tao kao-chiao)	483	*Lu-shi shan	311	Ma-an shan (Ma-an lieh-tao)	368	Lü-shun	705	Maan shan (Min chiang), <i>see</i> Ch'iu-lung shan	169	Storm signals	705	Ma-an tao	252	Lü-shun chiang	700	Ma-an-shan hsü	217	Approach	699	Mabaag, <i>see</i> Mabag	188	beacons, light	700	Mabag	188	measured distance	699	Mabatui point	193	Deratisation	705	Mabudis island	195	Dry dock	706	Mabup'o mal	539	Entrance channel	700	Mac Allum, Mount	257																				
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Lung-ao	100	Traffic signals	702	* Po-ti	101	Lutao tsui	401	anchorage	101	Lu-t'o tao	491	Lung-chu	269	Lu-tou-t'ou	404	Lung-dun, <i>see</i> Hsiao-liang-t'ou	308	Lu-tu-tao	426	Lung-hsü-tao k'ou	429	Lu-t'zu hsü	142	Lung-hua tsui	382	Lu-wang, <i>see</i> Liu-heng tao	300	Lung-k'ou	453	Lu-wang, Cape; <i>see</i> Tung-lang tsui	309	Chiang	453	Lu-yeh-t'ou	296	anchorages	454	Lu-ying	268	beacons, buoys	453	Luzon, northern side	181	facilities	454	Tidal streams	181	lights	454	Luzon strait	187	Wan	453	Lwan ho, <i>see</i> Luan ho	475	tidal streams	454	*Lwan point	310	Lungkow, <i>see</i> Lung-k'ou	453	Lwankiakau, <i>see</i> Ch'in-chia-k'ou	452	Harbour, <i>see</i> Lung-k'ou chiang	453	Lyne rock	309	Lung-men :				Ao, <i>see</i> Ch'ien-shui wan	101	Ma :		Chiang	439	Chiao	162	P'ing-chou	439	Do (Chongdung hae)	548	Lung-miao tsui	433	Do (Kwansu gak)	590	Lung-mu chiao	273	Do (Naju kundo)	543	Lungmun :		Hsü	316	Flats, <i>see</i> Lung-men p'ing-chou	439	Shan (Shan-tung kao-chiao)	428	Harbour, <i>see</i> Lung-men chiang	439	Shan (Yen-t'ai)	439	River, <i>see</i> Hsin-an ho	439	Tao	93	Lung-munn chiang	425	To'-tzu	672	Lung-tai railway	396	Maan do (Amnok kang)	666	Lung-t'ien yen	254	Light	667	Lung-tou jetty	127	Maan do (Soan kundo)	517	Lungtse	440	Ma-an lieh-tao	368	Lung-tung tsui	444	Northern part	372	Lung-wan t'ou	278	North-eastern part	371	Lung-wang t'ang	699	North-western part	370	Lung-wen	216	Southern part	368	Lung-ya shih	169	Tidal streams	368	Buoys	169	Ma-an shan (Chi-chu lieh-tao)	361	Lung-yen cove, <i>see</i> Lung-yen wan	431	*Ma-an shan (Chin-t'ang shan)	324	Lung-yen wan	431	Ma-an shan (Chou shan)	328	Lun-kau bay, <i>see</i> Lung-k'ou wan	453	Ma-an shan (Hobart channel)	308	Lu-shi san, <i>see</i> Lu-shi shan	311	Ma-an shan (Hu-lu-tao kao-chiao)	483	*Lu-shi shan	311	Ma-an shan (Ma-an lieh-tao)	368	Lü-shun	705	Maan shan (Min chiang), <i>see</i> Ch'iu-lung shan	169	Storm signals	705	Ma-an tao	252	Lü-shun chiang	700	Ma-an-shan hsü	217	Approach	699	Mabaag, <i>see</i> Mabag	188	beacons, light	700	Mabag	188	measured distance	699	Mabatui point	193	Deratisation	705	Mabudis island	195	Dry dock	706	Mabup'o mal	539	Entrance channel	700	Mac Allum, Mount	257																																								
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Lung-hsü-tao k'ou	429	Lu-t'zu hsü	142	Lung-hua tsui	382	Lu-wang, <i>see</i> Liu-heng tao	300	Lung-k'ou	453	Lu-wang, Cape; <i>see</i> Tung-lang tsui	309	Chiang	453	Lu-yeh-t'ou	296	anchorages	454	Lu-ying	268	beacons, buoys	453	Luzon, northern side	181	facilities	454	Tidal streams	181	lights	454	Luzon strait	187	Wan	453	Lwan ho, <i>see</i> Luan ho	475	tidal streams	454	*Lwan point	310	Lungkow, <i>see</i> Lung-k'ou	453	Lwankiakau, <i>see</i> Ch'in-chia-k'ou	452	Harbour, <i>see</i> Lung-k'ou chiang	453	Lyne rock	309	Lung-men :				Ao, <i>see</i> Ch'ien-shui wan	101	Ma :		Chiang	439	Chiao	162	P'ing-chou	439	Do (Chongdung hae)	548	Lung-miao tsui	433	Do (Kwansu gak)	590	Lung-mu chiao	273	Do (Naju kundo)	543	Lungmun :		Hsü	316	Flats, <i>see</i> Lung-men p'ing-chou	439	Shan (Shan-tung kao-chiao)	428	Harbour, <i>see</i> Lung-men chiang	439	Shan (Yen-t'ai)	439	River, <i>see</i> Hsin-an ho	439	Tao	93	Lung-munn chiang	425	To'-tzu	672	Lung-tai railway	396	Maan do (Amnok kang)	666	Lung-t'ien yen	254	Light	667	Lung-tou jetty	127	Maan do (Soan kundo)	517	Lungtse	440	Ma-an lieh-tao	368	Lung-tung tsui	444	Northern part	372	Lung-wan t'ou	278	North-eastern part	371	Lung-wang t'ang	699	North-western part	370	Lung-wen	216	Southern part	368	Lung-ya shih	169	Tidal streams	368	Buoys	169	Ma-an shan (Chi-chu lieh-tao)	361	Lung-yen cove, <i>see</i> Lung-yen wan	431	*Ma-an shan (Chin-t'ang shan)	324	Lung-yen wan	431	Ma-an shan (Chou shan)	328	Lun-kau bay, <i>see</i> Lung-k'ou wan	453	Ma-an shan (Hobart channel)	308	Lu-shi san, <i>see</i> Lu-shi shan	311	Ma-an shan (Hu-lu-tao kao-chiao)	483	*Lu-shi shan	311	Ma-an shan (Ma-an lieh-tao)	368	Lü-shun	705	Maan shan (Min chiang), <i>see</i> Ch'iu-lung shan	169	Storm signals	705	Ma-an tao	252	Lü-shun chiang	700	Ma-an-shan hsü	217	Approach	699	Mabaag, <i>see</i> Mabag	188	beacons, light	700	Mabag	188	measured distance	699	Mabatui point	193	Deratisation	705	Mabudis island	195	Dry dock	706	Mabup'o mal	539	Entrance channel	700	Mac Allum, Mount	257																																																												
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Lung-k'ou	453	Lu-wang, Cape; <i>see</i> Tung-lang tsui	309	Chiang	453	Lu-yeh-t'ou	296	anchorages	454	Lu-ying	268	beacons, buoys	453	Luzon, northern side	181	facilities	454	Tidal streams	181	lights	454	Luzon strait	187	Wan	453	Lwan ho, <i>see</i> Luan ho	475	tidal streams	454	*Lwan point	310	Lungkow, <i>see</i> Lung-k'ou	453	Lwankiakau, <i>see</i> Ch'in-chia-k'ou	452	Harbour, <i>see</i> Lung-k'ou chiang	453	Lyne rock	309	Lung-men :				Ao, <i>see</i> Ch'ien-shui wan	101	Ma :		Chiang	439	Chiao	162	P'ing-chou	439	Do (Chongdung hae)	548	Lung-miao tsui	433	Do (Kwansu gak)	590	Lung-mu chiao	273	Do (Naju kundo)	543	Lungmun :		Hsü	316	Flats, <i>see</i> Lung-men p'ing-chou	439	Shan (Shan-tung kao-chiao)	428	Harbour, <i>see</i> Lung-men chiang	439	Shan (Yen-t'ai)	439	River, <i>see</i> Hsin-an ho	439	Tao	93	Lung-munn chiang	425	To'-tzu	672	Lung-tai railway	396	Maan do (Amnok kang)	666	Lung-t'ien yen	254	Light	667	Lung-tou jetty	127	Maan do (Soan kundo)	517	Lungtse	440	Ma-an lieh-tao	368	Lung-tung tsui	444	Northern part	372	Lung-wan t'ou	278	North-eastern part	371	Lung-wang t'ang	699	North-western part	370	Lung-wen	216	Southern part	368	Lung-ya shih	169	Tidal streams	368	Buoys	169	Ma-an shan (Chi-chu lieh-tao)	361	Lung-yen cove, <i>see</i> Lung-yen wan	431	*Ma-an shan (Chin-t'ang shan)	324	Lung-yen wan	431	Ma-an shan (Chou shan)	328	Lun-kau bay, <i>see</i> Lung-k'ou wan	453	Ma-an shan (Hobart channel)	308	Lu-shi san, <i>see</i> Lu-shi shan	311	Ma-an shan (Hu-lu-tao kao-chiao)	483	*Lu-shi shan	311	Ma-an shan (Ma-an lieh-tao)	368	Lü-shun	705	Maan shan (Min chiang), <i>see</i> Ch'iu-lung shan	169	Storm signals	705	Ma-an tao	252	Lü-shun chiang	700	Ma-an-shan hsü	217	Approach	699	Mabaag, <i>see</i> Mabag	188	beacons, light	700	Mabag	188	measured distance	699	Mabatui point	193	Deratisation	705	Mabudis island	195	Dry dock	706	Mabup'o mal	539	Entrance channel	700	Mac Allum, Mount	257																																																																				
Chiang	453	Lu-yeh-t'ou	296	anchorages	454	Lu-ying	268	beacons, buoys	453	Luzon, northern side	181	facilities	454	Tidal streams	181	lights	454	Luzon strait	187	Wan	453	Lwan ho, <i>see</i> Luan ho	475	tidal streams	454	*Lwan point	310	Lungkow, <i>see</i> Lung-k'ou	453	Lwankiakau, <i>see</i> Ch'in-chia-k'ou	452	Harbour, <i>see</i> Lung-k'ou chiang	453	Lyne rock	309	Lung-men :				Ao, <i>see</i> Ch'ien-shui wan	101	Ma :		Chiang	439	Chiao	162	P'ing-chou	439	Do (Chongdung hae)	548	Lung-miao tsui	433	Do (Kwansu gak)	590	Lung-mu chiao	273	Do (Naju kundo)	543	Lungmun :		Hsü	316	Flats, <i>see</i> Lung-men p'ing-chou	439	Shan (Shan-tung kao-chiao)	428	Harbour, <i>see</i> Lung-men chiang	439	Shan (Yen-t'ai)	439	River, <i>see</i> Hsin-an ho	439	Tao	93	Lung-munn chiang	425	To'-tzu	672	Lung-tai railway	396	Maan do (Amnok kang)	666	Lung-t'ien yen	254	Light	667	Lung-tou jetty	127	Maan do (Soan kundo)	517	Lungtse	440	Ma-an lieh-tao	368	Lung-tung tsui	444	Northern part	372	Lung-wan t'ou	278	North-eastern part	371	Lung-wang t'ang	699	North-western part	370	Lung-wen	216	Southern part	368	Lung-ya shih	169	Tidal streams	368	Buoys	169	Ma-an shan (Chi-chu lieh-tao)	361	Lung-yen cove, <i>see</i> Lung-yen wan	431	*Ma-an shan (Chin-t'ang shan)	324	Lung-yen wan	431	Ma-an shan (Chou shan)	328	Lun-kau bay, <i>see</i> Lung-k'ou wan	453	Ma-an shan (Hobart channel)	308	Lu-shi san, <i>see</i> Lu-shi shan	311	Ma-an shan (Hu-lu-tao kao-chiao)	483	*Lu-shi shan	311	Ma-an shan (Ma-an lieh-tao)	368	Lü-shun	705	Maan shan (Min chiang), <i>see</i> Ch'iu-lung shan	169	Storm signals	705	Ma-an tao	252	Lü-shun chiang	700	Ma-an-shan hsü	217	Approach	699	Mabaag, <i>see</i> Mabag	188	beacons, light	700	Mabag	188	measured distance	699	Mabatui point	193	Deratisation	705	Mabudis island	195	Dry dock	706	Mabup'o mal	539	Entrance channel	700	Mac Allum, Mount	257																																																																								
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facilities	454	Tidal streams	181	lights	454	Luzon strait	187	Wan	453	Lwan ho, <i>see</i> Luan ho	475	tidal streams	454	*Lwan point	310	Lungkow, <i>see</i> Lung-k'ou	453	Lwankiakau, <i>see</i> Ch'in-chia-k'ou	452	Harbour, <i>see</i> Lung-k'ou chiang	453	Lyne rock	309	Lung-men :				Ao, <i>see</i> Ch'ien-shui wan	101	Ma :		Chiang	439	Chiao	162	P'ing-chou	439	Do (Chongdung hae)	548	Lung-miao tsui	433	Do (Kwansu gak)	590	Lung-mu chiao	273	Do (Naju kundo)	543	Lungmun :		Hsü	316	Flats, <i>see</i> Lung-men p'ing-chou	439	Shan (Shan-tung kao-chiao)	428	Harbour, <i>see</i> Lung-men chiang	439	Shan (Yen-t'ai)	439	River, <i>see</i> Hsin-an ho	439	Tao	93	Lung-munn chiang	425	To'-tzu	672	Lung-tai railway	396	Maan do (Amnok kang)	666	Lung-t'ien yen	254	Light	667	Lung-tou jetty	127	Maan do (Soan kundo)	517	Lungtse	440	Ma-an lieh-tao	368	Lung-tung tsui	444	Northern part	372	Lung-wan t'ou	278	North-eastern part	371	Lung-wang t'ang	699	North-western part	370	Lung-wen	216	Southern part	368	Lung-ya shih	169	Tidal streams	368	Buoys	169	Ma-an shan (Chi-chu lieh-tao)	361	Lung-yen cove, <i>see</i> Lung-yen wan	431	*Ma-an shan (Chin-t'ang shan)	324	Lung-yen wan	431	Ma-an shan (Chou shan)	328	Lun-kau bay, <i>see</i> Lung-k'ou wan	453	Ma-an shan (Hobart channel)	308	Lu-shi san, <i>see</i> Lu-shi shan	311	Ma-an shan (Hu-lu-tao kao-chiao)	483	*Lu-shi shan	311	Ma-an shan (Ma-an lieh-tao)	368	Lü-shun	705	Maan shan (Min chiang), <i>see</i> Ch'iu-lung shan	169	Storm signals	705	Ma-an tao	252	Lü-shun chiang	700	Ma-an-shan hsü	217	Approach	699	Mabaag, <i>see</i> Mabag	188	beacons, light	700	Mabag	188	measured distance	699	Mabatui point	193	Deratisation	705	Mabudis island	195	Dry dock	706	Mabup'o mal	539	Entrance channel	700	Mac Allum, Mount	257																																																																																				
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